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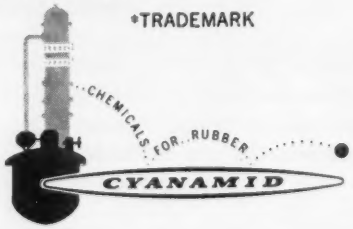

Rubber Age

COVERING THE MANUFACTURE OF RUBBER AND RUBBERLIKE PLASTICS PRODUCTS

NOVEMBER, 1961 VOL. 90, NO. 2

Published Monthly by
PALMERTON PUBLISHING CO., INC.
Editorial and Advertising Offices
101 West 31st St., New York 1, N. Y.
Phone: PEnnsylvania 6-6872

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* Appears every other month

Microfilm copies of complete volumes of RUBBER AGE are available from University Microfilms, 313 North First St., Ann Arbor, Mich. Indexed in Applied Science and Technology Index and Engineering Index

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RUBBER AGE is published monthly by the Palmerton Publishing Co., Inc., Printing Office, East Stroudsburg, Pa. Editorial and Advertising Offices at 101 West 31st Street, New York 1, N. Y. Entered as second class matter Oct. 30, 1933, at the Post Office at East Stroudsburg, Pa., under the Act of March 3, 1879. Subscription in United States, $5.00 a year; Canada, $5.50; Foreign, $6.00; Single copy, 75c. November, 1961. Vol. 90, No. 2.

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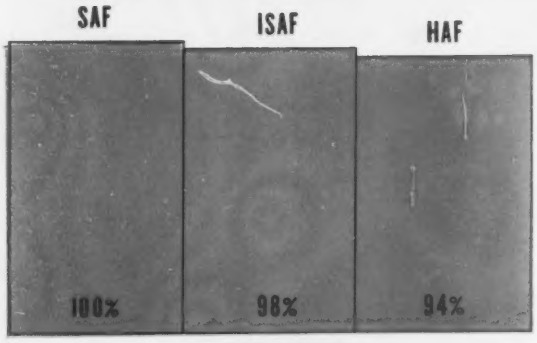
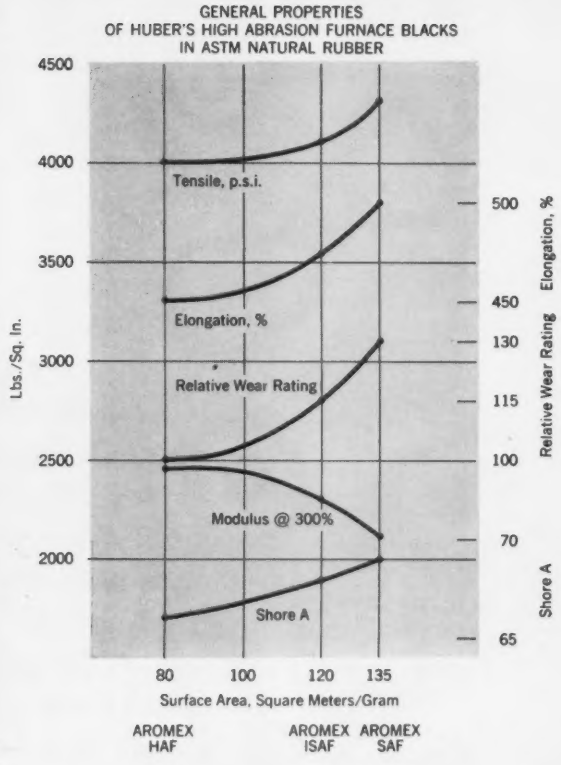


Abrasion Resistance



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Highlights Sidelights *of the News...*

November, 1961

Red China is reported to be making a concerted effort to increase production of both natural and synthetic rubber in order to meet its domestic consumption demands . . . It is reported that Red China has increased natural rubber planting by 30 times since 1949 . . . The country now produces SBR, nitrile and polychloroprene rubbers (page 284).

Over 375 members of the New York, Philadelphia and Connecticut Rubber Groups attended a joint technical meeting on October 20 in New York City . . . Four technical papers were presented at the meeting which also included a dinner at which George Vila, president of U.S. Rubber, spoke (page 286).

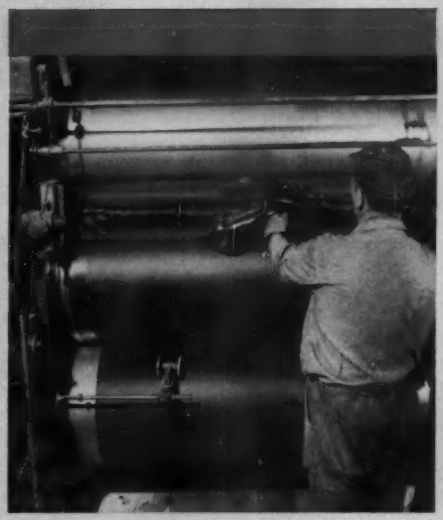
Goodyear has tripled its supply of radioactive Cobalt-60 in a stepped-up program to explore the effects of nuclear energy upon rubber and plastics . . . The company's Akron research laboratories has now become one of the largest industrial radiation research facilities in the country (page 288).

Financing arrangements have been completed for an important portion of a $72 million petrochemical complex to be built in Argentina to supply that country's major needs for synthetic rubber and other products . . . Five United States companies are sponsoring the project including U.S. Rubber, Witco Chemical, Continental Oil, Cities Service and Fish International Corp. (page 291).

Texas-U.S. Chemical Co. has completed a new research and development laboratory at Parsippany, N. J., which incorporates many of the most modern high polymer research tools available . . . The two-story structure is designed to house a staff of up to 100 persons and includes more than 20 separate laboratories for analysis, research and developmental work (page 293).

A feature of the October 3 meeting of the Los Angeles Rubber Group was the award of an honorary life membership in the group to Dr. Fernley H. Banbury, inventor of the Banbury mixer . . . Mr. Banbury is the thirteenth person to be so honored by the group (page 308).

Goodrich-Gulf Chemicals has announced plans to increase productive capacity at its Institute, West Va. SBR plant by approximately eight per cent . . . The expansion includes the addition of polymerization reactors and related equipment . . . The new equipment will provide for increased production of light colored, non-staining types of rubber as well as add flexibility in the production of all types of cold SBR (page 309).



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coming events

Nov. 26-Dec. 1. American Society of Mechanical Engineers, Winter Annual Meeting, Statler Hilton Hotel, New York, N. Y.

Nov. 29-Dec. 1. Tenth Annual Wire & Cable Symposium, Berkeley-Carteret Hotel, Asbury Park, N. J.

Nov. 30. Washington Rubber Group, National Press Club, Washington, D. C.

Dec. 2. Northern California Rubber Group, Christmas Party.

Dec. 7. Fort Wayne Rubber & Plastics Group, Van Orman Hotel, Fort Wayne, Ind.

Dec. 8. Detroit Rubber & Plastics Group, Christmas Party, Statler Hilton Hotel, Detroit, Mich.

Dec. 8. Los Angeles Rubber Group, Christmas Party, Beverly Hilton Hotel, Beverly Hills, Calif.

Dec. 9. Southern Ohio Rubber Group, Christmas Party.

Dec. 12. Buffalo Rubber Group, Christmas Party, Buffalo Trap and Field Club, Buffalo, N. Y.

Dec. 12. Ontario Rubber Group, Prudhommes, Vineland, Ontario, Canada.

Dec. 15. Boston Rubber Group, Christmas Party, Somerset Hotel, Boston, Mass.

Dec. 15. Chicago Rubber Group, Christmas Party, Morrison Hotel, Chicago, Ill.

Dec. 15. New York Rubber Group, Christmas Party, Henry Hudson Hotel, New York, N. Y.

Dec. 26-31. American Association for the Advancement of Science, Chemistry Division Annual Meeting, Denver, Colo.

Jan. 26, 1962. Akron Rubber Group, Technical Meeting, Sheraton Hotel, Akron, Ohio.

Jan. 18, 1962. Quebec Rubber & Plastics Group, Joint Meeting with Society of Plastics Engi-Engineers, Ruby Foo's, Montreal, Quebec, Canada.

Jan. 26, 1962. Quebec Rubber & Plastics Group, Joint Technical Meeting with SPE, Montreal, Quebec, Canada.

Jan. 26, 1962. Chicago Rubber Group, Technical Meeting, Furniture Club, Chicago, Ill.

Jan. 30-Feb. 2, 1962. Society of Plastics Engineers, 18th Annual Technical Conference, Penn-Sheraton Hotel, Pittsburgh, Penna.

Feb. 5-9, 1962. ASTM Committee Week, Statler Hilton Hotel, Dallas, Texas.

Feb. 7-9, 1962. Committee D-11 on Rubber and Rubber-Like Materials, ASTM, Statler Hilton Hotel, Dallas, Texas.

Feb. 8, 1962. Fort Wayne Rubber & Plastics Group, Technical Meeting, Van Orman Hotel, Fort Wayne, Ind.

Feb. 23, 1962. Akron Rubber Group, Annual Dance, Sheraton Hotel, Akron, Ohio.

Feb. 23, 1962. Quebec Rubber & Plastics Group, Ladies Night, Victoria Hall, Montreal, Quebec, Canada.

March 2-4, 1962. Boston Rubber Group, Ski Weekend.

March 13-14, 1962. Manufacturing Chemists' Association, Symposium on Packaging of Chemical Products, Chase-Park Plaza Hotels, St. Louis, Mo.

March 16, 1962. Chicago Rubber Group, Technical Meeting, Furniture Club, Chicago, Ill.

March 20-29, 1962. American Chemical Society, 141st National Meeting, Washington, D. C.

March 22, 1962. Quebec Rubber & Plastics Group, Technical Meeting, Montreal, Quebec, Canada.

March 23, 1962. New York Rubber Group, Spring Meeting.

April 5, 1962. Akron Rubber Group, Technical Meeting, Sheraton Hotel, Akron, Ohio.

April 5, 1962. Fort Wayne Rubber & Plastics Group, Van Orman Hotel, Fort Wayne, Ind.

April 19, 1962. Quebec Rubber & Plastics Group, Technical Meeting, Montreal, Quebec, Canada.

April 24-27, 1962. Division of Rubber Chemistry, American Chemical Society, Hotel Statler, Boston, Mass.

April 26, 1962. Fort Wayne Rubber & Plastics Group, Van Orman Hotel, Fort Wayne, Ind.

May 4, 1962. Chicago Rubber Group, Technical Meeting, Morrison Hotel, Chicago, Ill.

May 4, 1962. Division of Rubber Chemistry, Chemical Institute of Canada, Niagara Falls, Ontario, Canada.

May 14-18, 1962. Institut Francais du Caoutchouc, International Rubber Conference, Paris, France.

May 22-25, 1962. Institution of the Rubber Industry, 4th International Rubber Technology Conference, Church House, Westminster, London, England.

June 1, 1962. Quebec Rubber & Plastics Group, Golf Outing.

June 7, 1962. New York Rubber Group, Summer Outing.

June 8, 1962. Fort Wayne Rubber & Plastics Group, Golf Outing, Tippecanoe Country Club, Leesburgh, Ind.

June 22, 1962. Akron Rubber Group, Summer Outing, Firestone Country Club, Akron, Ohio.

June 24-29, 1962. ASTM Annual Meeting and Apparatus Exhibit, Hotel Statler, New York, N. Y.

July 20, 1962. Chicago Rubber Group, Golf Outing, St. Andrews Country Club, West Chicago, Ill.

August 2, 1962. New York Rubber Group, Golf Outing.

Sept. 9-14, 1962. American Chemical Society, 142nd National Meeting, Atlantic City, N. J.

Sept. 20, 1962. Fort Wayne Rubber & Plastics Group, Van Orman Hotel, Fort Wayne, Ind.

Sept. 30-Oct. 5, 1962. ASTM Pacific Area Meeting and Apparatus Exhibit, Hotel Statler, Los Angeles, Calif.

Oct. 16-19, 1962. Division of Rubber Chemistry, American Chemical Society, Hotel Sheraton, Cleveland, Ohio.

Oct. 19, 1962. New York Rubber Group, Fall Meeting.

Nov. 25-30, 1962. American Society of Mechanical Engineers, Winter-Annual Meeting, Statler Hilton Hotel, New York, N. Y.

Dec. 6, 1962. Fort Wayne Rubber & Plastics Group, Van Orman Hotel, Fort Wayne, Ind.

Dec. 14, 1962. New York Rubber Group, Christmas Party

Jan. 22-25, 1963. Society of Plastic Engineers, 19th Annual Technical Conference, Ambassador Hotel, Los Angeles, Calif.

Feb. 4-8, 1963. ASTM Committee Week, Queen Elizabeth Hotel, Montreal, Quebec, Canada.

Feb. 7, 1963. Fort Wayne Rubber & Plastics Group, Van Orman Hotel, Fort Wayne, Ind.

March 31-April 5, 1963. American Chemical Society, 143rd National Meeting, Los Angeles, Calif.

May 7-10, 1963. Division of Rubber Chemistry, American Chemical Society, Royal York Hotel, Toronto, Ontario, Canada.

June 7, 1963. Fort Wayne Rubber & Plastics Group, Golf Outing, Tippecanoe Country Club, Leesburgh, Ind.

June 23-28, 1963. ASTM Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

Sept. 8-13, 1963. American Chemical Society, 144th National Meeting, New York, N. Y.

Sept. 10-13, 1963. Division of Rubber Chemistry, American Chemical Society, Hotel Roosevelt, New York, N. Y.

Feb. 3-7, 1964. ASTM Committee Week, Sheraton Hotel, Philadelphia, Penna.

April 28-May 1, 1964. Division of Rubber Chemistry, American Chemical Society, Sheraton-Cadillac Hotel, Detroit, Mich.

Sept. 1-4, 1964. Division of Rubber Chemistry, American Chemical Society, Sherman Hotel, Chicago, Ill.

May 4-7, 1965. Division of Rubber Chemistry, American Chemical Society, Fountainebleau Hotel, Miami Beach, Fla.

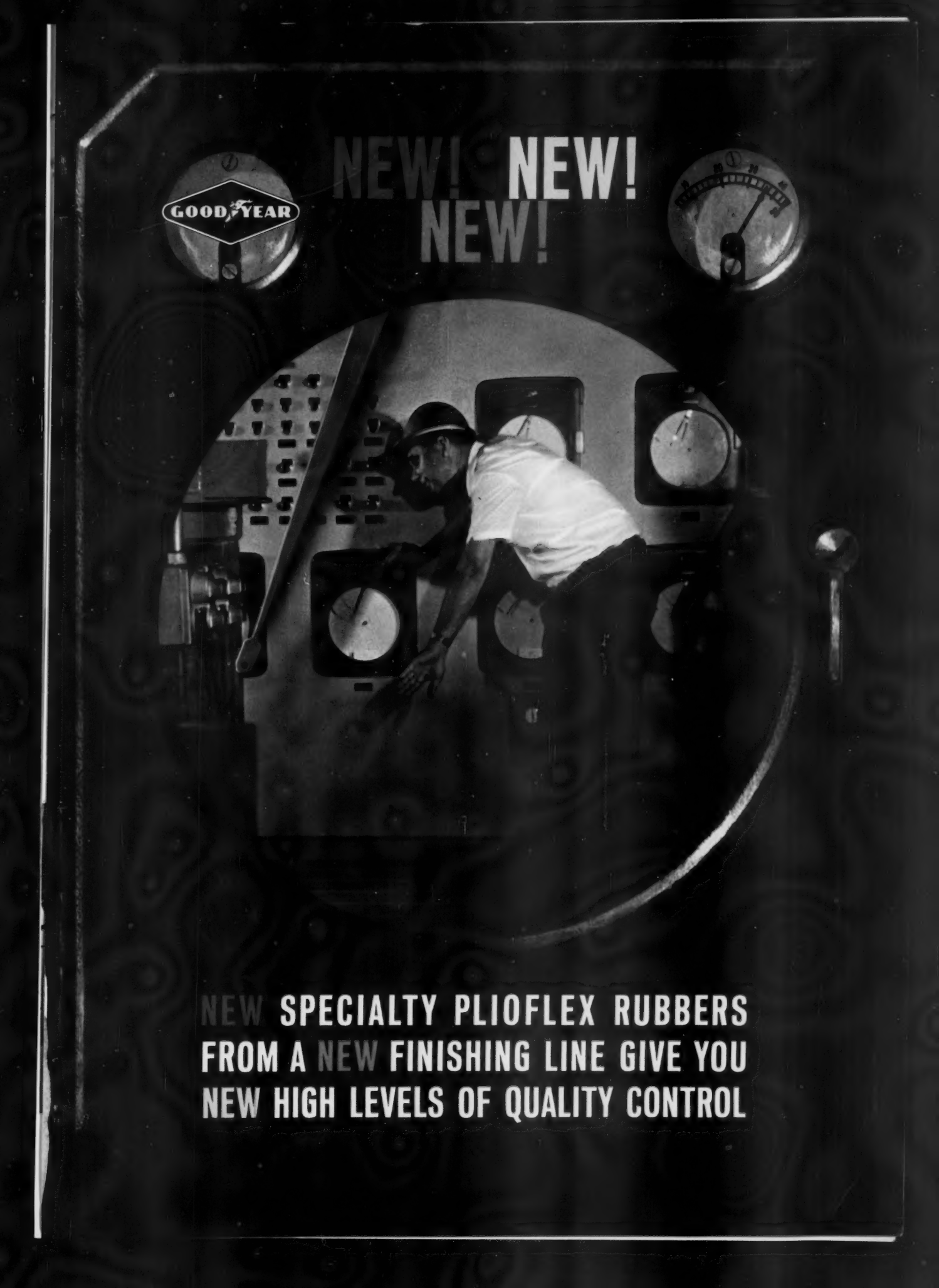
Oct. 19-22, 1965. Division of Rubber Chemistry, American Chemical Society, Bellevue-Stratford Hotel, Philadelphia, Penna.

May 3-6, 1966. Division of Rubber Chemistry, American Chemical Society, Fairmount Hotel, San Francisco, Calif.

Sept. 13-16, 1966. Division of Rubber Chemistry, American Chemical Society, New York, N. Y.

May 2-5, 1967. Division of Rubber Chemistry, American Chemical Society, Queen Elizabeth Hotel, Montreal, Quebec, Canada.

Sept. 12-15, 1967. Division of Rubber Chemistry, American Chemical Society, Sherman Hotel, Chicago, Ill.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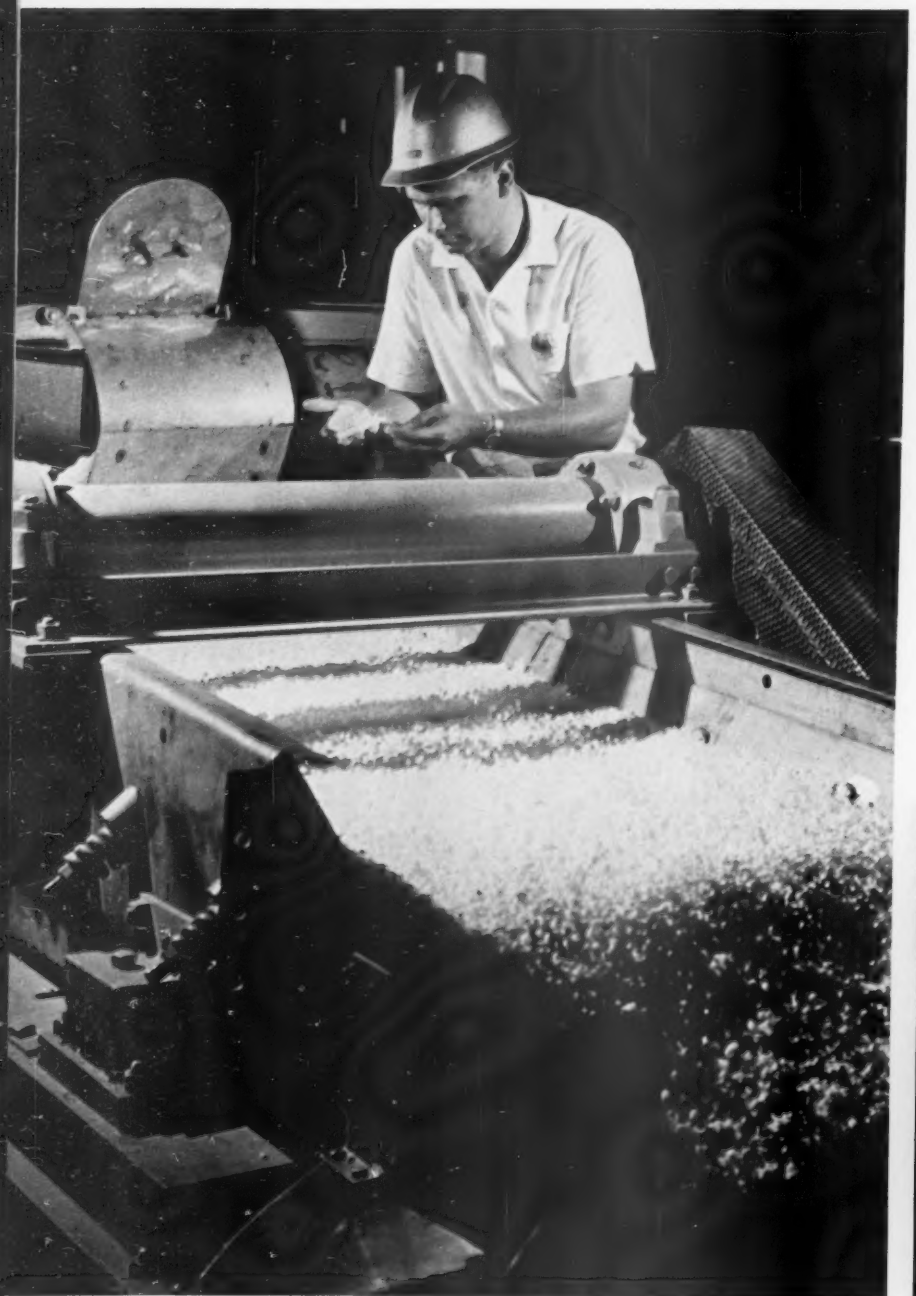

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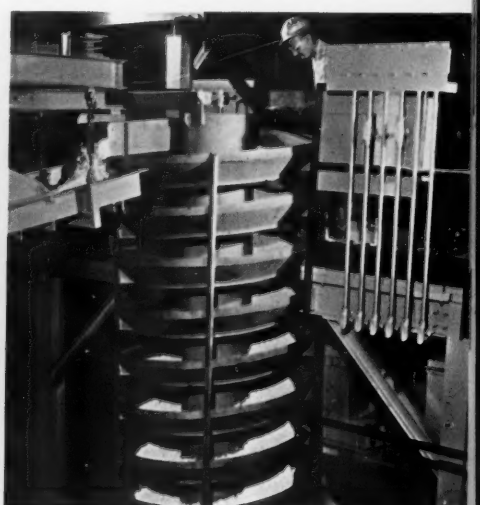

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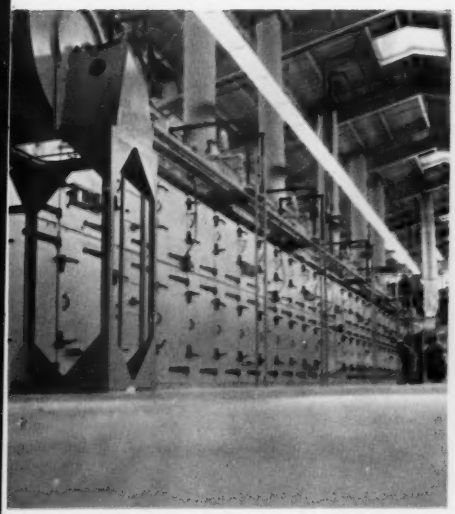

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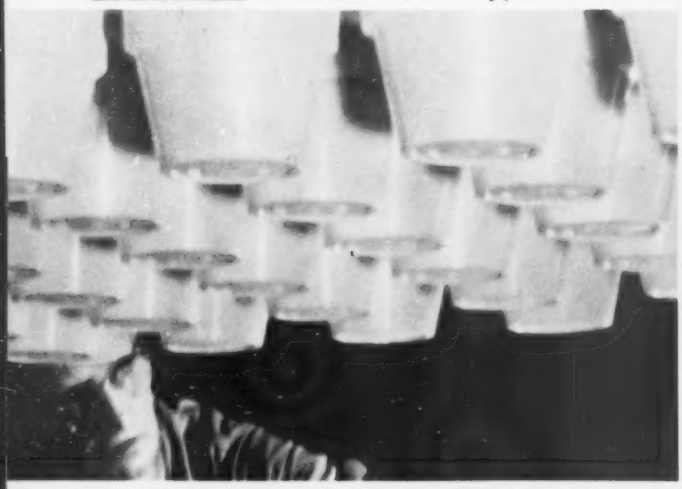

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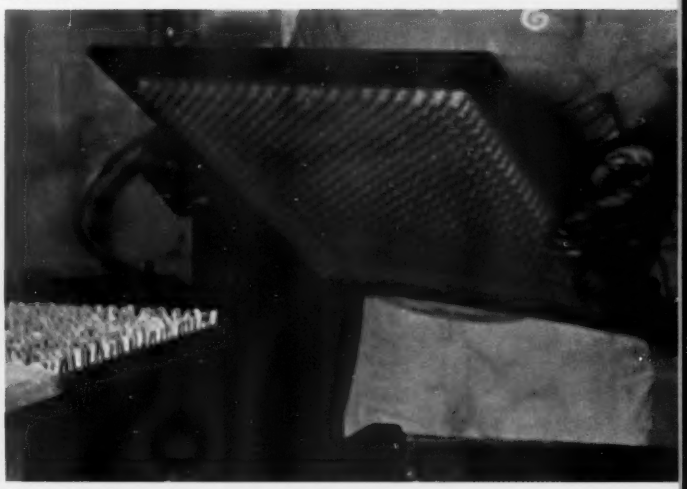
PROBLEM: Cut rejects in manufacture of low-cost, rubber flower pots.
PROBLEM-SOLVER: PLIOFLEX 1773. Although oil-extended, its excellent color and high uniformity permitted fast, continuous production of consistently acceptable products.



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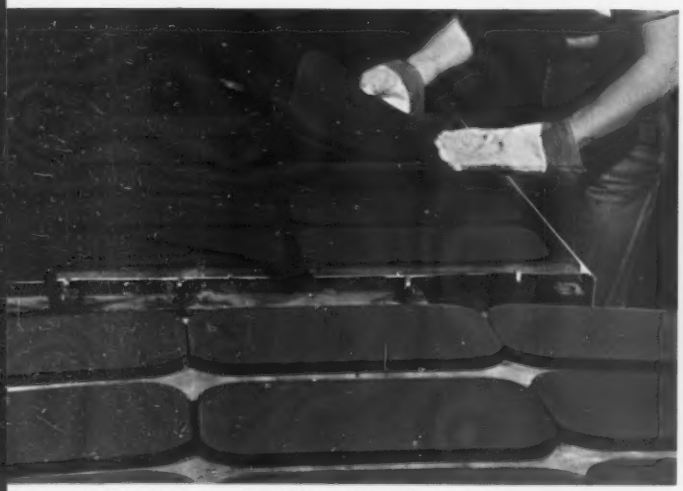
PROBLEM: Cut costs on daily output of 2 million pencil erasers.
PROBLEM-SOLVER: PLIOFLEX 1006. Its processing ease, uniformity and cleanliness eliminated premastication and permitted reuse of scrap without grinding, while providing a better aging product.



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PROBLEM: Improve production of blown rubber kneeling pads while maintaining quality.
PROBLEM-SOLVER: PLIOFLEX 1510. It reduced sticking, permitted lower curing temperatures and provided reworkable scrap. At the same time, it improved cell structure and tear strength.

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PROBLEM-SOLVER: PLIOFLEX 1778. Low in cost and oil-extended, its light color, uniformity and toughness permitted economical production of durable, brightly colored, highly salable mats.

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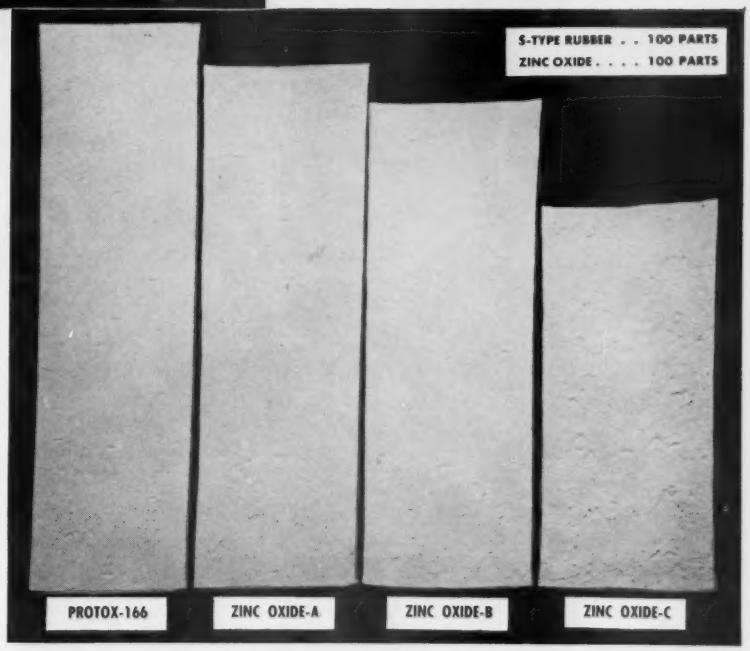

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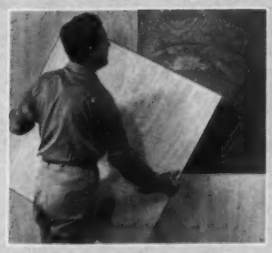

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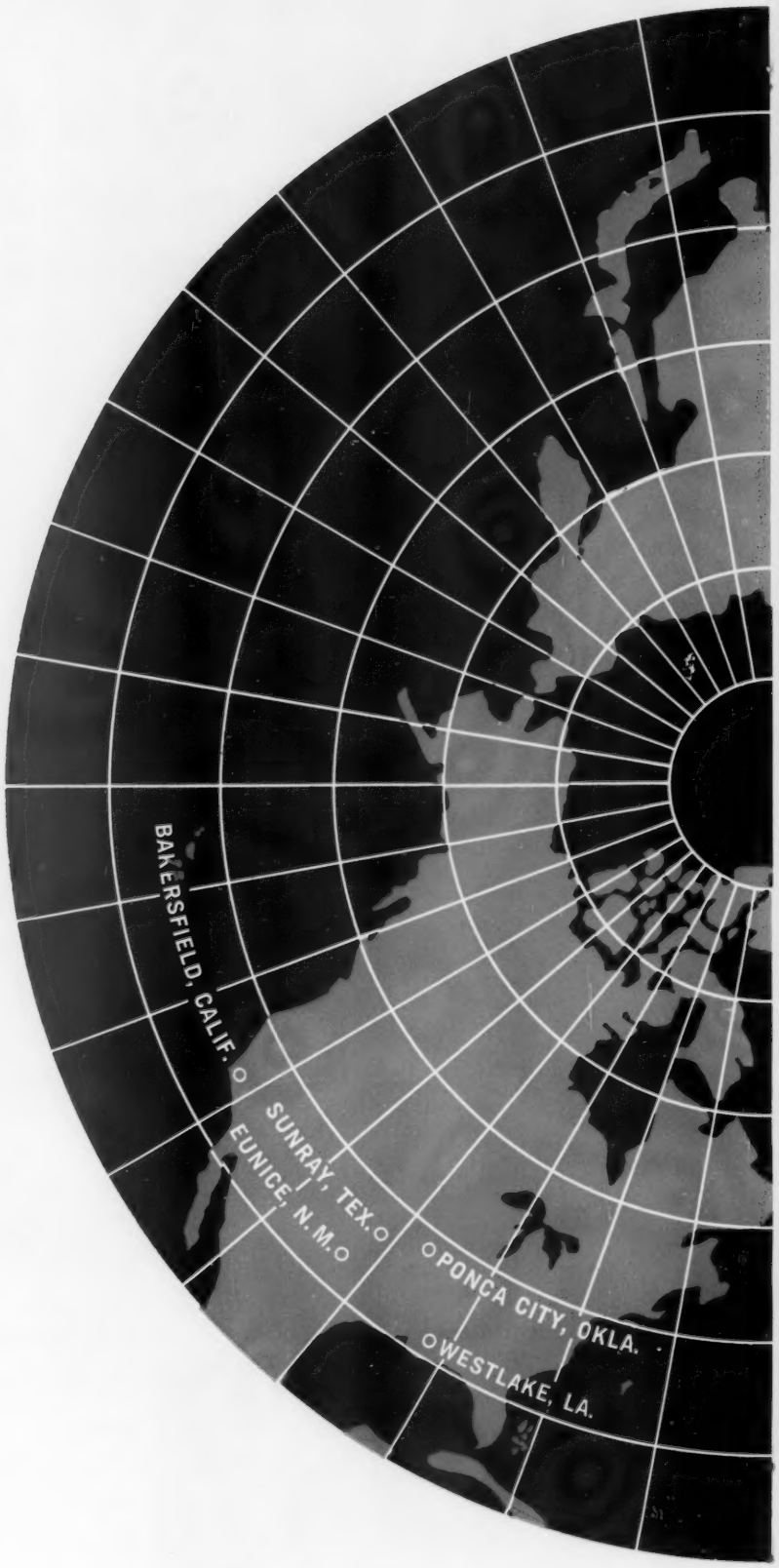

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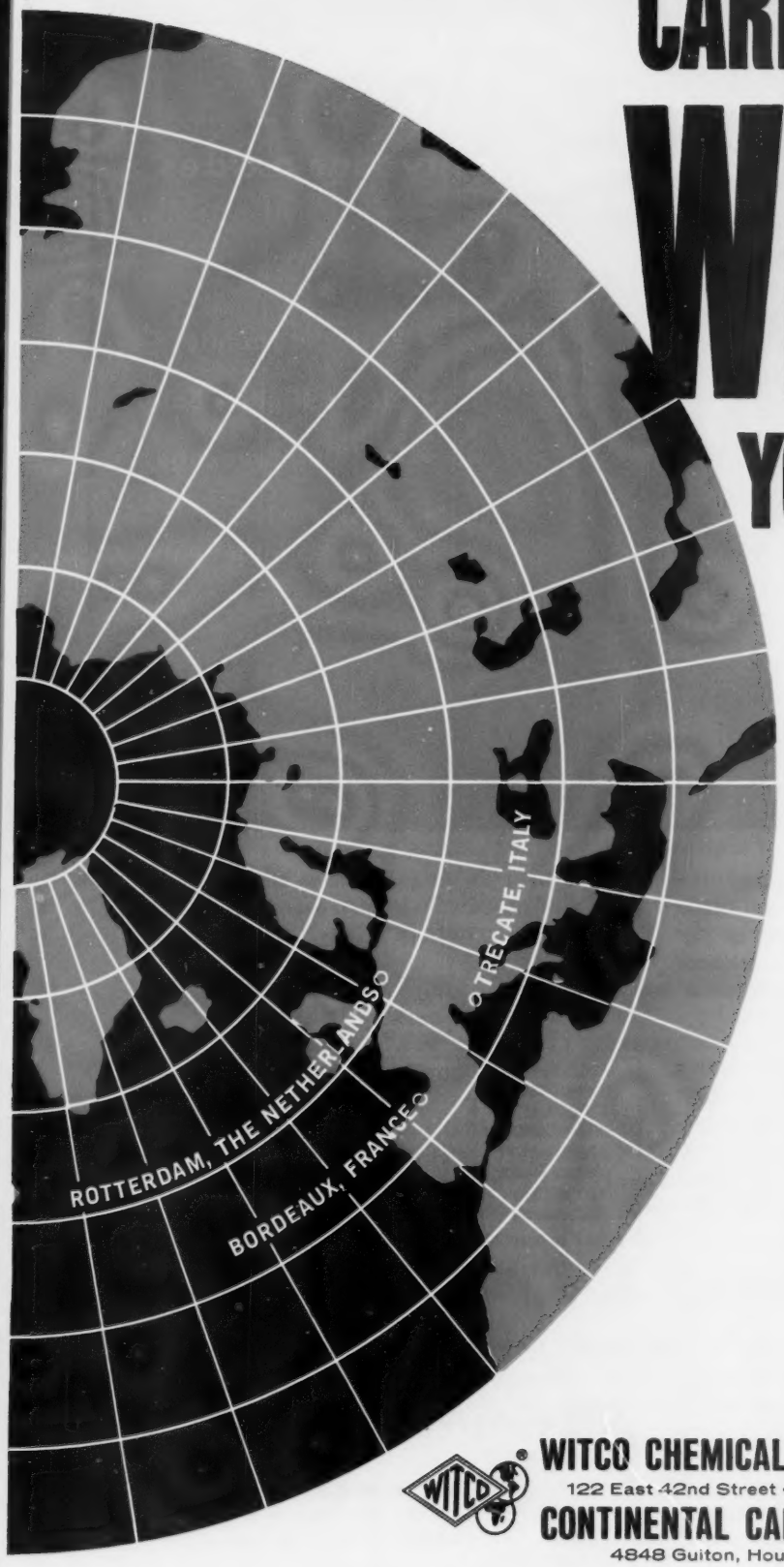

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capitol cues

LAGGING CONSUMER BUYING IS CAUSING SOME CONCERN about the course of the business upturn. Economists in government and industry are basically optimistic. But the current recovery is now three quarters old and retail sales are still lackadaisical. So the experts are becoming a little jumpy.

> Consumer buying plays a vital role in recoveries. It spurs industry to keep adding to inventory--the force that started the upturn. Also, rising spending makes businessmen feel that their existing plant is inadequate...and so it leads to expansion of capacity, a very dynamic plus for the economy.

THE CONSUMER WILL INCREASE HIS BUYING this quarter, in the view of many economists--if, indeed, the quickening hasn't already started. (It's usually a month before figures show any trend.) The experts are confident because income has been rising, consumers have built up backlogs of needs, and surveys suggest that confidence in the future is slowly being restored.

> What if consumers disappoint and don't step up their buying? Then, analysts say, look for business to surge a bit later--after the year-end, rather than before. And they feel that this may be a healthy thing, spreading out the boom so that it lasts longer and doesn't finally finish with a big bust.

NO SHARP INCREASES IN CONSUMER PRICES ARE LIKELY during the rest of this year--and this stability may be an important factor in spurring retail sales. Big supplies and keen competition will generally prevail over rising wage costs. Looking further into the future, though, the prospect for 1962 is for some moderate increases in the indexes, as consumer demand goes up.

> Here, by category, is what price economists see ahead--
> -Food: Costs will be level until year-end, except for dips in meats. But get set for moderate increases during 1962.
> -Apparel: Present stability will be followed by gradual hikes in 1962, as the impact of the new minimum wage hits.
> -Autos: Strong initial demand, plus strike-depleted stocks, will limit discounting until Spring--meaning firm prices, even if Detroit has not raised plant prices on the whole.
> -Appliances: Prices are expected to firm up some in coming months as the consumer finally increases his purchasing.
> -Services: The brisk march of the past decade will continue, led by rent and the cost of medical care--mainly insurance.

THE STABILITY IN WHOLESALE PRICES IS ABOUT TO END, after three long and remarkable years. Government price specialists say that an upturn is inevitable, if the business recovery goes as generally forecast. The index, now 119% of the 1947-49 base, is likely to rise 3 points by end of 1962.

> Farm products and processed foods will be lifted by cuts in acres planted and higher government crop-support prices. Among the industrials, there will be higher prices for such basic commodities as metals, textiles, pulp and paper, as well as for many kinds of machinery and production equipment.

capitol cues (cont'd)

GET SET FOR TOUGHER PRESSURE FROM LABOR for ever-bigger benefits. Labor experts in Washington see the recent settlements in the auto industry as a breakthrough for unions generally--as setting new targets to shoot at. This may not be so important for the rest of 1961, when few major contracts come up for negotiation. But it will dominate labor relations during 1962.

> The item in the auto package that could mean headaches for employers in many other lines is the big step taken toward "salaries" for production workers. Hourly workers get paid for wages lost in short weeks. Aim is to force more even scheduling...to avoid layoffs...to give workers security.
>
> Other gains won by the union include 7¢ an hour in wages; expanded supplemental unemployment benefits; and assumption by management of the total cost of health-welfare insurance plans, part of which had, up to now, been borne by workers.

THERE'S DISAGREEMENT AS TO THE INFLATIONARY IMPLICATIONS of the auto settlement. It may not produce higher prices on 1962 cars. But economists fear that unions will be winning similar large benefits from companies that cannot afford to absorb the extra labor costs; they'll have to pass them on. Much depends on how many large companies will be hit--and for how much.

COSTS OF AMERICAN PRODUCERS AREN'T AS FAR OUT OF LINE with those of foreign firms as many believe. That's the conclusion that emerges from a recent study by the National Industrial Conference Board. It involved 100 companies with plants here and overseas. It showed that producers abroad do have lower costs on many articles--but not on all by any means. In fact, U. S. industry has lower unit costs on slightly more than half of the items compared. Labor costs us more, materials less. We produce more cheaply, over-all, than all areas of the world but West Europe, which has a 3% edge.

IF YOU ARE THINKING OF BUILDING A PLANT OR OFFICE, this could be as good a time to act as any you're going to see in the next year or two. For one thing, interest rates seem to have passed their cyclical lows; from now on, demand for money will grow and the supply will slip as folks save less. Building costs will firm, too, as wages keep rising and material costs climb with reviving demand; depressed lumber prices, for example, will rebound.

KENNEDY IS GOING ALL OUT TO COURT BUSINESS these days--a reversal of recent policy. His friendly meetings with business leaders are only first steps in his wooing campaign. The word is also going out to U.S. agencies to open the door to management men--to make them feel welcome and to listen to their views. It's not just because the President wants national unity in these days of international crisis. His economic advisers are worried that such things as his pressure on the steel-makers to hold the line on prices shake business confidence; such actions could choke off the business upturn.

> This doesn't mean that, say, the regulatory agencies will stop riding herd on business. They won't let up in their efforts to crack down on abuses or practices that restrain competition. But there'll be at least a lessening of the tendency toward sweeping, slashing policies of condemnation of whole industries. In short, the climate will change.

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	Minutes Cured @293°F	Ameripol 4758	Ameripol 4772
Tensile, psi	50	3030	2980
Elongation, %	50	660	710
Modulus, 300%, psi	25	630	640
	50	1060	1050
	100	1380	1320
Hardness, Shore A	50	69	58
Compounded viscosity, ML4 @212°F		52	52

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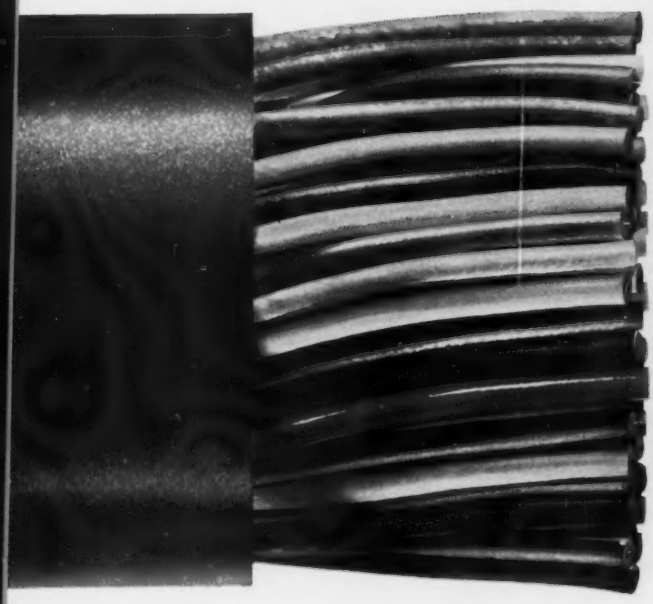

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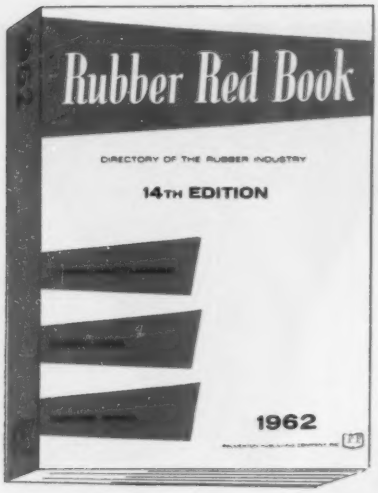

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Names and addresses of suppliers have again been consolidated into one complete alphabetical list, with sales and export offices shown in many cases. Telephone numbers, too, have been included for convenience. The Synthetic Rubber Section reflects the new and numerous new polymers and copolymers introduced in the past twelve months. Urethane materials have received special attention.

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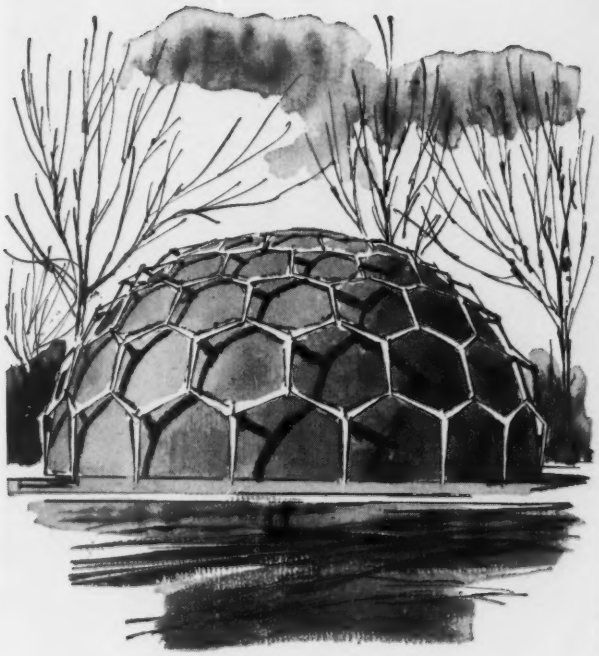

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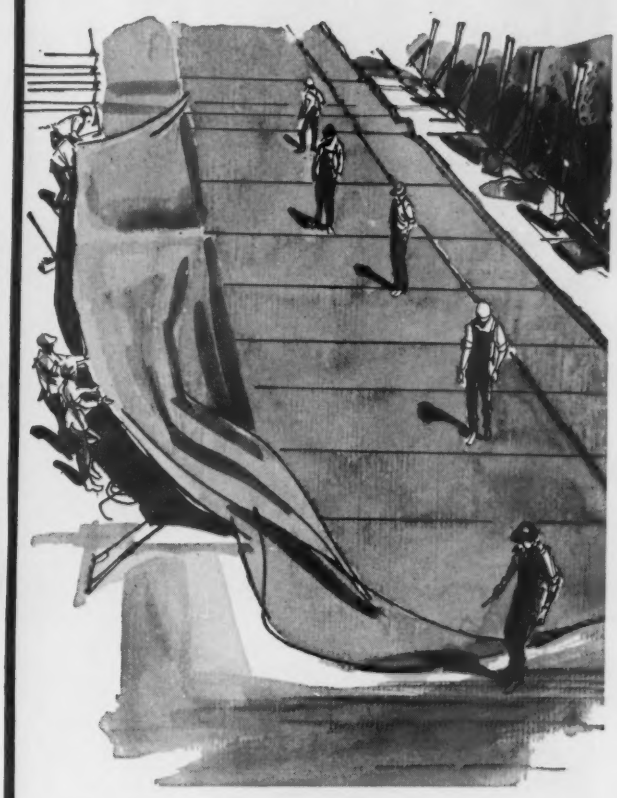

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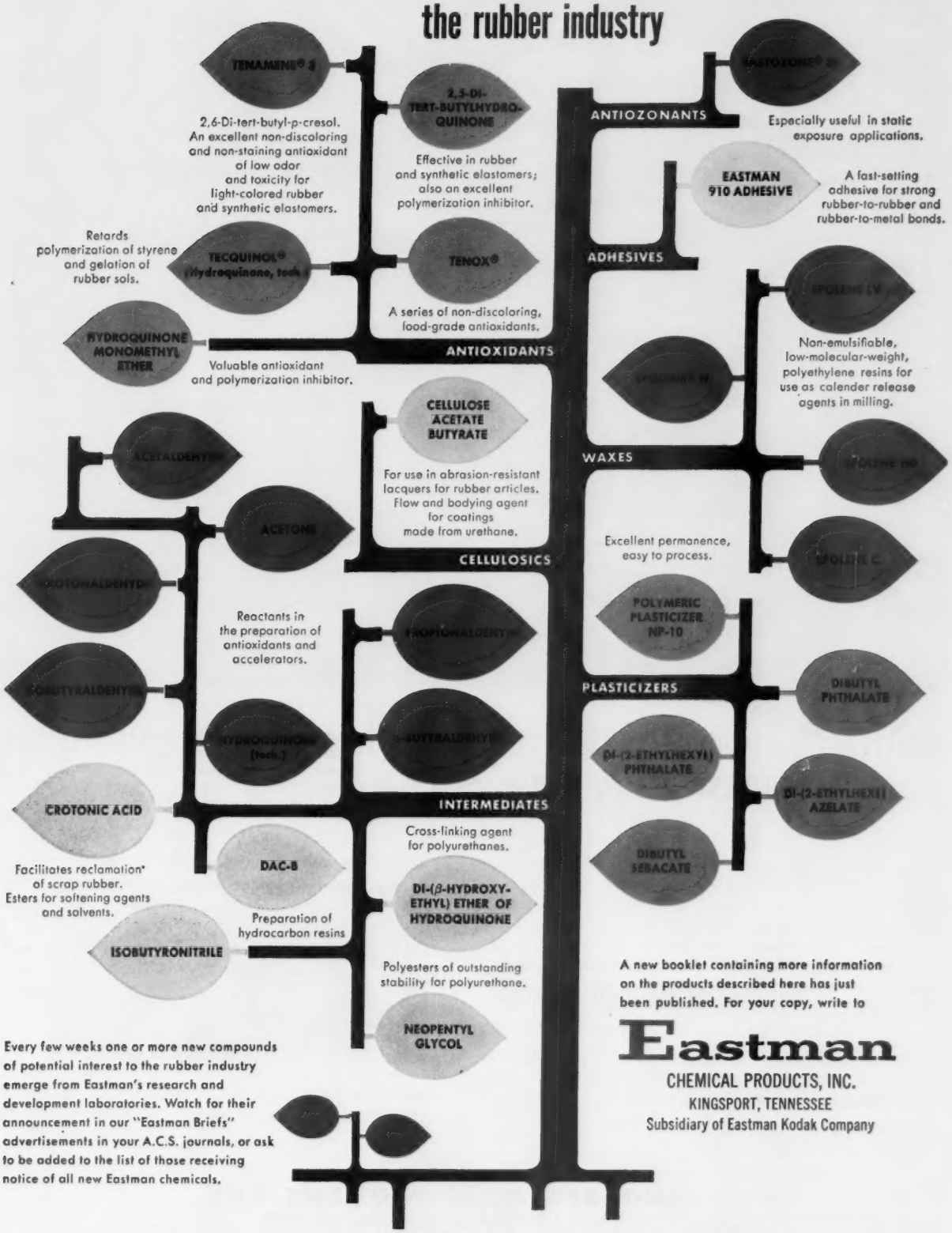

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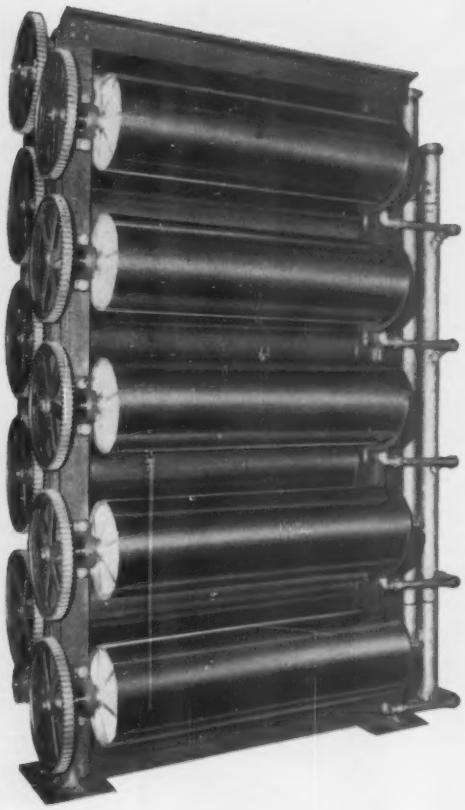

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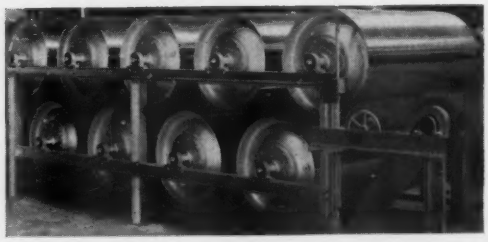

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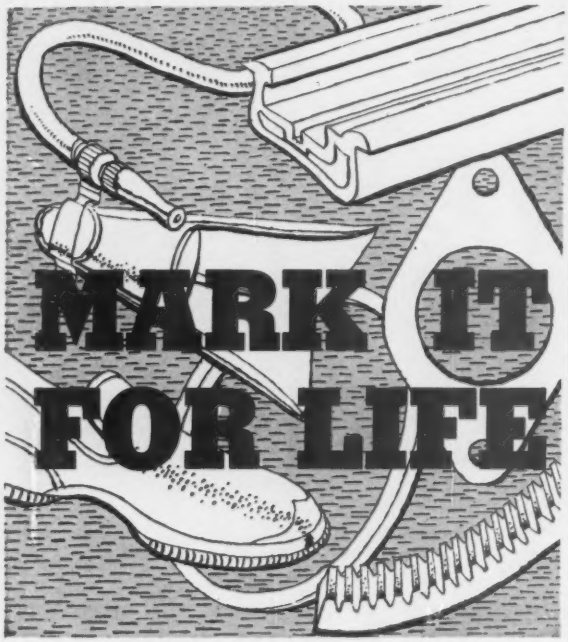

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Through carefully controlled processing, Kaumagraph has developed two types of transfers for the rubber industry — one to be applied to uncured rubber, the other, for application to cured rubber.

You put your brand or identification on your product for the lifetime of your product. You do it easily in bright colors, completely legible, and at low cost.

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Overseas

Iran—Production has begun at the $7 million tire plant erected near Teheran, Iran, by B. F. Goodrich Iran, S.A., a subsidiary of the B. F. Goodrich Co., in association with a group of Iranian investors. The 130,000 square foot factory will manufacture tires, tubes, and tread rubber for passenger cars and trucks.

England—A butyl rubber facility, reportedly the first butyl plant in England, is under construction at Southampton, by Esso Petroleum Co., Ltd. The unit will cost $12.5 million and will be capable of producing 25,000 tons of butyl rubber annually. The facility is expected to be completed in early 1962.

Argentina—A petrochemical complex will be installed at San Lorenzo by a group of United States companies. It has been estimated that the demand for synthetic and natural rubber in Argentina will be 44,000 tons for 1961, 51,000 tons next year, and 59,000 tons, 68,000 tons and 75,000 tons respectively in 1963, 1964 and 1965.

Hungary—The Budapest Rubber Goods Factory has imported machinery worth more than 8 million English pounds, to be installed in a new calendering department under construction at the plant. Work on the new facility, which covers more than one acre, is expected to be completed by the end of 1962.

Turkey—Sakarya Rubber Industry Corp. has a tire factory under construction at Arifiye, near Adapazari, which will have a capacity of 250,000 units annually. A Pirelli tire plant with an initial output of 120,000 tires and tubes is also under construction in Turkey.

Formosa—The International Cooperation Administration in Washington, D.C. has authorized Formosa to purchase $9,000,000 worth of goods, including rubber and rubber products. The purchases are to be made from the United States and from other ICA-specified countries.

Switzerland—Swiss rubber imports totalled 1,680,000 kilos in February, compared with 1,805,000 kilos in February, 1960. Natural rubber imports increased by nearly 25,000 kilos, while synthetic imports were 131,000 kilos lower.

Viet-Nam—A new plant for the production of tread rubber has been opened. The factory, which cost VN$10 million, is expected to be operating at full capacity soon, and will have an annual output estimated at 500 tons.

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SKELLYSOLVE-B. For making quick-setting cements for the shoe, tape, container, tire and other industries. Quick-drying, with no foreign taste or odor, in dried compound. Closed cup flash point about −25° F.

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SKELLYSOLVE-H. For general use in manufacturing operations and cements, where faster evaporation rate than that of Skellysolve-C is desired. Closed cup flash point about −16° F.

SKELLYSOLVE-L. For general manufacturing operations where a medium evaporation rate is required. Closed cup flash point about 12° F.

SKELLYSOLVE-R. For general use in tire building and a variety of other manufacturing operations and cements. Reduces evaporation losses. Medium quick final dry. Lessens bloating and skinning tendency. Closed cup flash point about −25° F.

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"It often seems as though an industry's technological advancement is akin to a snowball as it slides over the crest of the hill. The first stretch of time seems to be painstakingly slow. But as the variety of dead end possibilities are doggedly reduced and the technical man has a chance to build his statistical awareness of product variables, the pace picks up.

"The last fifteen years of the forty odd year history of furnace blacks has seen the development of three materials which far exceeded the expectations of the original developers. Like the snowball, the carbon black industry needed an assist. HAF found it in cold SBR. For ISAF, the subject of this presentation, the assist came when it was used in combination with oil-extended polymers."

I. CERESNA
Supervisor, Experimental Plant
Carbon Black Research

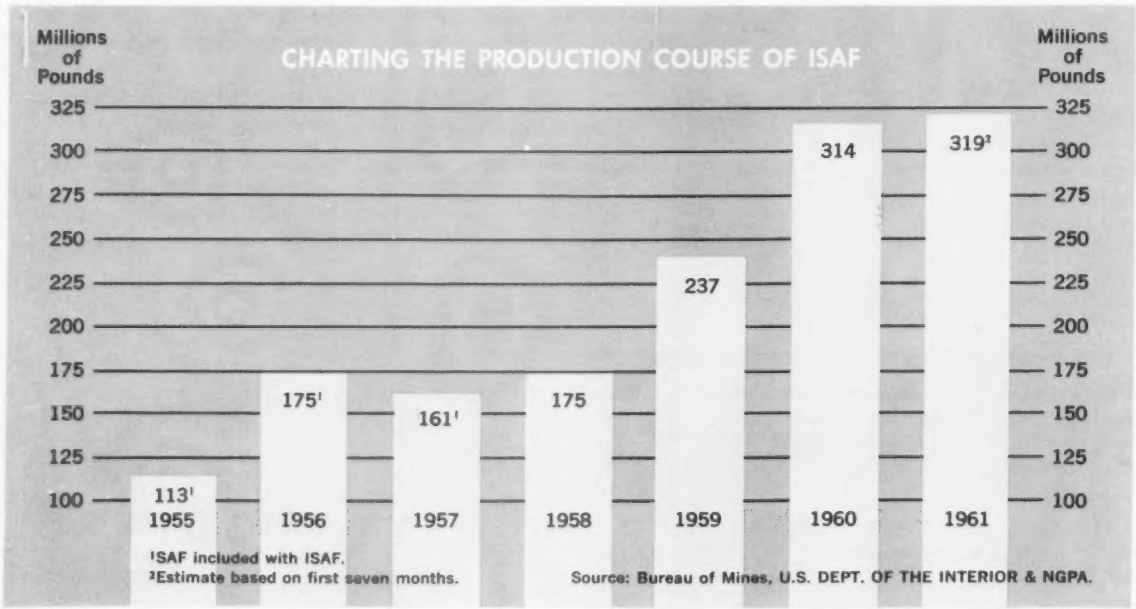
A Product in Perspective

ISAF Carbon Black

ISAF Carbon Black, or Intermediate Super Abrasion Furnace carbon black, is a tribute to the versatility of the furnace process. By modifying carbon black furnace techniques used to produce highly reinforcing blacks, abrasion resistance far in excess of channel blacks was made possible. ISAF carbon black coupled with oil extended rubber offered one of industry's first soft riding tires.

Forty years ago when the first patents were written on the furnace process, the "principal object . . . (was) to obtain a largely increased yield of good quality carbon black from a given amount of hydrocarbons." The true capability of the furnace principle was not evidenced however until the end of the Second World War. With the development of HAF, the furnace carbon black process did achieve its original claims in a full measure. The second objective of the industry during this period was to produce blacks which would eliminate or greatly reduce the industry's dependency on natural gas as a feedstock. This too was accomplished.

It was only, however, with the advent of HAF carbon black and the simultaneous development of cold SBR that the furnace process was able to pro-

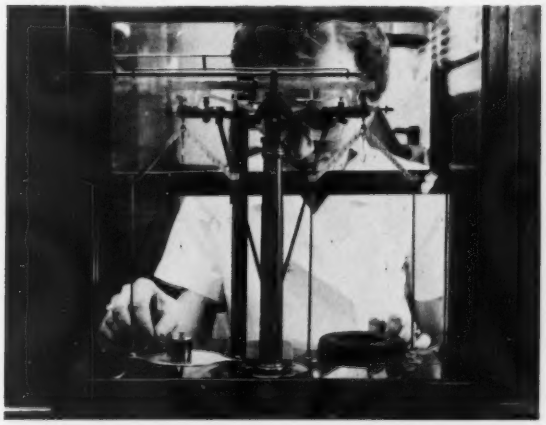


duce a material that could exceed the capabilities of channel carbon blacks.

In the early fifties improved carbon blacks were once again required. Reduction of the tire size and the increase in tire revolutions caused more severe wearing. As a result improved blacks were required to recapture lost mileage.

Product Quality Excellent, But—

The industry set their sights on a major property advance and after extensive development efforts produced SAF or Super Abrasion Furnace carbon blacks. The new black offered exceptionally high abrasion resistance. To achieve this product, however, the finest quality feedstock, a new and smaller furnace with concomitant loss of yield and very stringent manufacturing conditions were required. This resulted in a major cost increase.



Accurate weight measurements are taken before and after angle abrasion tests to determine abrasion resistance of an ISAF rubber compound.

Furthermore, SAF proved to be extremely difficult to process. At this stage of industry development there were no delayed action accelerators. Thus this product placed untenable economic burdens on all but a few premium applications.

As a result, a product and processing compromise was sought. The plan was to keep as much of the superior end property characteristics of SAF while achieving greater manufacturing economies. Secondly, every effort was made to bring processibility closer to the known technology experienced with HAF carbon black. Refinements of highly reinforcing black manufacturing techniques and upgrading of feedstock completed the assignment—intermediate SAF, or ISAF was the result.

Harnessing the Tougher Polymers

The advance in tire and tread requirements could not be met with the conventional SBR rubbers then in use. The higher Mooney rubber products had the toughness potential and the needed abrasion resistance. But again, much like SAF they were extremely difficult to process. Again the required economies did not allow their handling under existing factory fabricating conditions.

This problem was solved through an extending process whereby rubber grade oil softeners were added during the polymer manufacturing stage. This oil extended material needed the increased reinforcement provided by the new ISAF black.

The combination of these materials achieved the required processing ease and provided the improved abrasion resistance.

The two roll mill shown here offers variable speed and a 1 to 1.4 surface ratio. With this speed and surface ratio flexibility, most actual commercial production conditions can be simulated. This mill serves to cool and sheet ISAF compounds at varying speeds allowing broader case history testing studies.

Significant Advantages

A review of the three significant reasons for using a particular carbon black in rubber is in order. These three functions are the simplest parameters available to view the capability of a particular black on a comparative basis.

Briefly these parameters are as follows:

1. Reinforcement (wear and service life)
2. Filler (economy)
3. Processing aid (mixing and fabrication)

ISAF carbon black was established as a compromise. It provides satisfactory processing ease and maintains a good portion of the super abrasion characteristics. In another view it compensated for the reinforcement loss brought about by the introduction of tougher polymers which required oil extension for processing. HAF could not provide this improved mileage when used with the oil extended polymers.

ISAF in combination with the tougher oil extended polymers provided increased mileage even under the severe conditions imposed by today's new and more powerful automobile engines. Improved wear was in the neighborhood of 10-15% over that available with HAF carbon black.

In the important small truck tire field ISAF in SBR gives improved mileage but at the expense of a slight increase in tread cracking and cut growth. Here it was approximately 7% better than HAF.

In natural rubber applications which were subjected to severe service demands ISAF far outdistanced channel blacks in wear. The ISAF technology opened a new page in industry's capability to handle the tougher polymer products. It suggests an interesting potential for the new stereo rubbers.

As a general statement ISAF is characterized by slightly reduced modulus, increased elongation and tensile strength, higher hysteresis and slightly reduced resistance to flex cracking when compared with HAF carbon black.

As is always the case, you reach to achieve a particular quality level and you lose a portion of your economy savings. ISAF requires increased Banbury power and must be extruded at a slower rate.

In mechanical rubber goods markets it offers the necessary answer for products which are subjected to severe service conditions.

ISAF is an outstanding carbon black that produced a significant upgrading of quality standards. Once again there was a parallel development in the rubber hydrocarbon field.

If you have a particular question relating to ISAF carbon black or any other carbon black manufactured by United Carbon Company, please write to United Carbon Co., Inc., 410 Park Avenue, New York 22, N. Y.

PROPERTIES OF ISAF IN REVIEW

PROPERTIES*		SAF	ISAF	HAF	EPC
Surface Area	Sq.M/Gm.	127.2	101.8	69.2	106.8
Particle Dia.	Microns	24.6	30.7	45.2	30.0
Volatile Matter	%	1.92	1.45	1.63	5.70
Ash	%	0.27	0.50	0.24	0.05
pH	—	9.6	9.1	9.2	4.3
Iodine Number	Mg./Gm.	140.0	125.0	76.1	75.0
Tint Comparison	—	400.0	385.0	366.0	364.0

*Property values are based on United Carbon and/or ASTM test procedures. Values given are typical.

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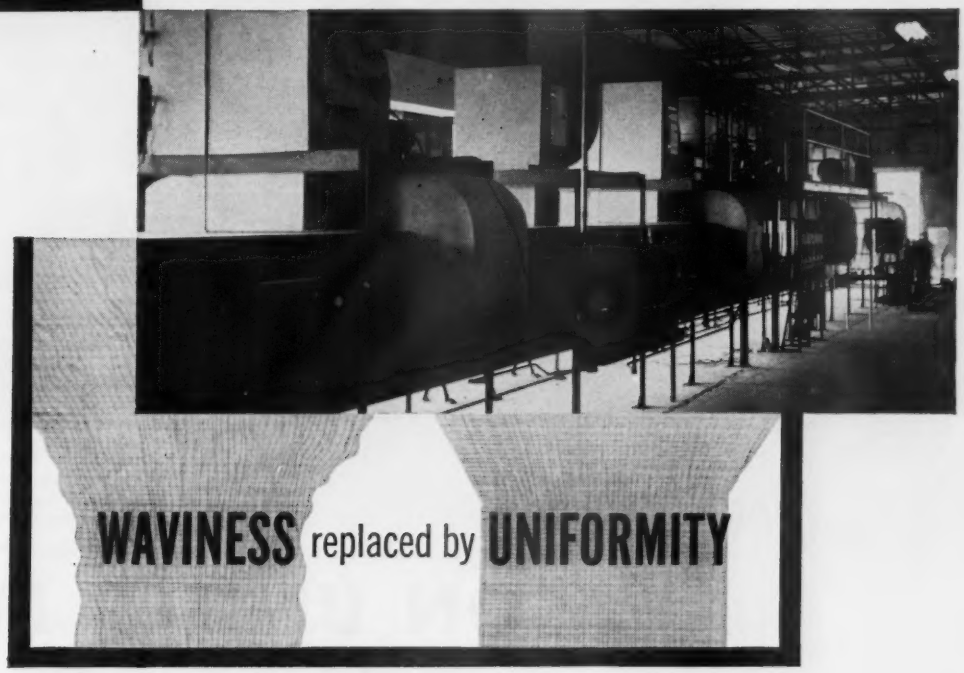

LATEX SATURATED FABRIC shrinkage control... the major problem!

In this special application of an 'Engineered Atmosphere' the key step was not so much to control temperature, hence the drying, but rather to control shrinking. Shrinkage, because of the nature of the material, was unavoidable. The problem was to get the web to shrink uniformly across the width. This in turn called for the proper introduction, direction and circulation of the hot air stream at the right temperature. The project is working very effectively. Uneven shrinkage has been eliminated. Maximum utilization of the web by the processor is assured.

This is the kind of work that is well within the scope of Ross Engineering Service. It definitely involves the creation and maintenance of an 'Engineered Atmosphere' as do practically all drying, curing, baking, treating and similar treating and processing problems. Ross Engineers have been serving industry in this way for more than thirty-five years.

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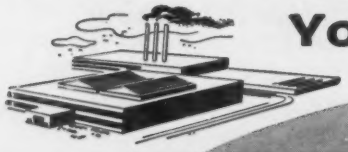

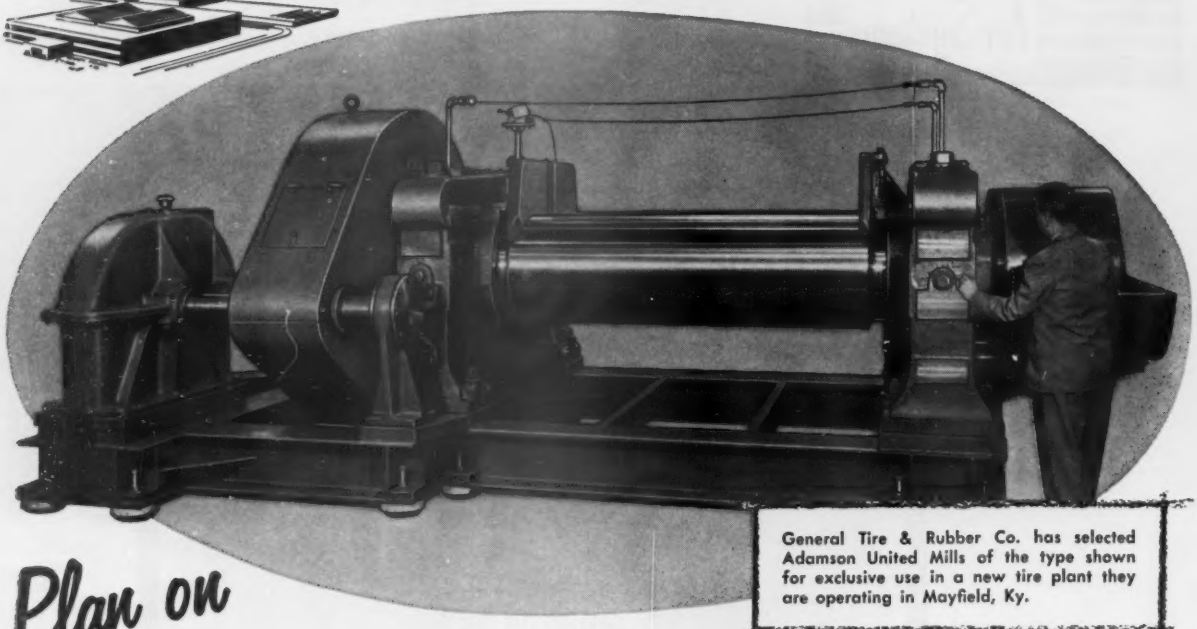

General Tire & Rubber Co. has selected Adamson United Mills of the type shown for exclusive use in a new tire plant they are operating in Mayfield, Ky.

Plan on

ADAMSON UNITED MILLS

for rubber or plastics processing

Yes, whether your plans are for one mill or many, standard or special mills, Adamson United can meet your requirements with mills recognized industry-wide for high production efficiency and trouble-free operation.

Standard units are available in a wide range of sizes from 6″ x 16″ to 28″ x 84″, as well as special sizes and types to meet specific requirements. They can be supplied driven individually, in pairs, or in groups on a line shaft. When equipped with leveling-type vibration mounts with fabricated base as illustrated, or with hot-rolled steel plate base, costs of mill installation are substantially reduced . . . on a sturdy floor in good condition, no special foundation is required.

For other new installations Adamson United engineers have drawn on years of experience to produce new simplified mill units which combine only the most desirable design and operational features . . . the result being mills of highest quality offered most economically. Call on Adamson United to help plan **new** installations, or to update existing facilities. We welcome the opportunity to serve you.

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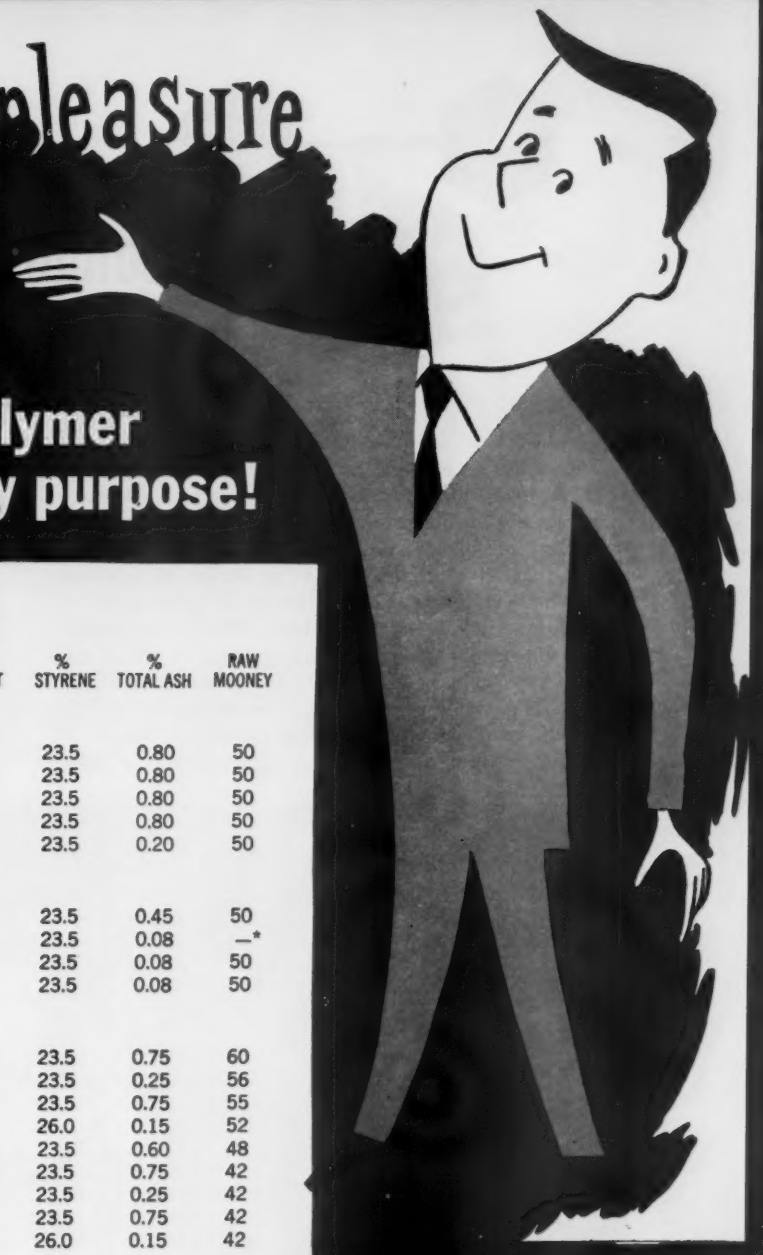

ASRC has a polymer for every purpose!

DESIGNATION	TYPE	STAB.	EMUL.	COAG.	OIL TYPE-AMOUNT	% STYRENE	% TOTAL ASH	RAW MOONEY
GENERAL PURPOSE TYPES								
1000	Hot	ST	FA	SA		23.5	0.80	50
1006	Hot	NS	FA	SA		23.5	0.80	50
1500	Cold	ST	RA	SA		23.5	0.80	50
1502	Cold	NS	FA/RA	SA		23.5	0.80	50
3106	Cold	NS	FA	GA		23.5	0.20	50
WIRE AND CABLE TYPES								
1004	Hot	ST	FA	AL		23.5	0.45	50
1018	Hot	NS	FA	GA		23.5	0.08	—*
1019	Hot	NS	FA	GA		23.5	0.08	50
1503	Cold	NS	FA	GA		23.5	0.08	50
OIL-EXTENDED TYPES								
1703	Cold	NS	FA/RA	SA	N 25.0	23.5	0.75	60
1708	Cold	NS	FA	GA	N 37.5	23.5	0.25	56
1712	Cold	ST	FA/RA	SA	HA 37.5	23.5	0.75	55
1713	Cold	NS	FA/RA	GA	N 50.0	26.0	0.15	52
1714	Cold	ST	FA/RA	SA	HA 50.0	23.5	0.60	48
3153	Cold	NS	FA/RA	SA	N 25.0	23.5	0.75	42
3158	Cold	NS	FA	GA	N 37.5	23.5	0.25	42
3162	Cold	ST	FA/RA	SA	HA 37.5	23.5	0.75	42
3163	Cold	NS	FA/RA	GA	N 50.0	26.0	0.15	42
SPECIAL TYPES								
1009	Hot	NS	FA	SA		23.5	0.70	—†
1507	Cold	NS	FA/RA	SA		23.5	0.80	33
3015	Hot	NS	RA	SA		40.0	0.90	64
3100	Cold	NS	FA	GA		23.5	0.20	40
3105	Cold	NS	FA/RA	AL		23.5	0.50	33
3110	Cold	NS	FA/RA	AL		23.5	0.50	26
3115	Cold	NS	FA/RA	AL		40.0	0.60	33

Plus **FLOSBRENE**—The first commercially available **liquid** SBR and **CISDENE**—The new, improved-processing, stereo-specific high cis-polybutadiene rubber.

NS—Non-Staining **ST**—Staining **FA**—Fatty Acid **RA**—Rosin Acid **SA**—Salt Acid
GA—Glue Acid **AL**—Alum **N**—Naphthenic **HA**—Highly Aromatic
*—Cross-linked, Cpd. ML_4 125 †—Cross-linked, Cpd. ML_4 120

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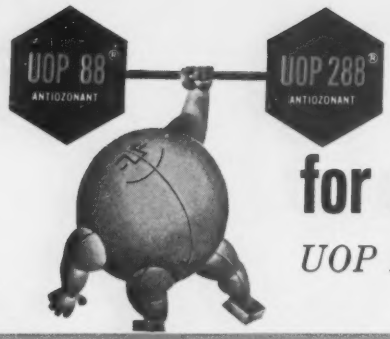

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UOP Antiozonants and the UOP Field Specialist

Increasing ozone concentrations in many areas make it more and more necessary that your products have the best possible protection against ozone cracking.

Excellent chemical antiozonants...UOP 88 and 288 . . . that have proven their effectiveness in hundreds of challenging applications are readily available.

But in protecting against ozone attack, an outstanding antiozonant is only the beginning of the story. The type of natural or synthetic polymer used . . . the curing system . . . the reinforcing agent . . . the service conditions under which the product is to be used . . . all of these factors must be correctly interpreted, co-ordinated, and balanced to provide the most effective protection.

That's where the services of UOP's Field Specialist become important. Qualified by training and long personal experience, he can draw on the results of years of continuous research and testing at UOP's laboratories . . . covering the use of thousands of antiozonant formulations on a wide variety of base stocks. His recommendations may necessarily cover many phases of your operation . . . and they will represent the latest, most effective method of combating the ozone problem for greater customer satisfaction.

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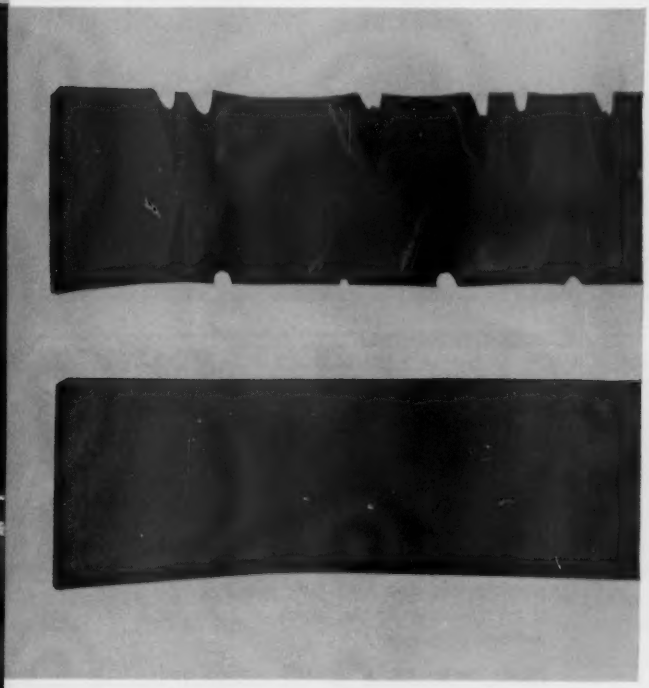
At UOP research laboratories, cabinet testing under exaggerated conditions of stress and ozone concentration proves effectiveness of formulations for various product applications.

Test strips below show results of proper and improper compounding. Both strips had 3 phr of UOP 88. This provided excellent protection in bottom strip which was properly compounded. Improper selection of compounding ingredients caused failure in top strip.



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Reasons for its efficiency are Seamag's high adsorptive capacity, extremely fine particle size and high-bulk density. It mills readily in the batch and produces uniform dispersion.

Made by an exclusive FMC process and backed by fully integrated production and inexhaustible raw material supply, Seamag is attractively priced and amply available.

Samples and data on request.

*Reg. T.M.

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MINERAL PRODUCTS DIVISION

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News in Brief

► Philadelphia Insulated Wire Co., Moorestown, N. J., is producing Teflon "FEP" insulated wires, for use in back panelling in electronic data processing equipment and miniature circuiting, which have been UL approved.

► Atlantic Research Corp., Alexandria, Va., has acquired the National Northern Division of American Potash and Chemical Corp., a pyrotechnic research, development and production unit, located in West Hanover, Mass.

► U. S. Rubber Co., New York, N. Y., has named the Sam M. Butler Co., Charlotte, N. C., as exclusive selling agent for its synthetic and combed cotton knitting yarns in North and South Carolina and Virginia.

► "Sturtevant Dry Processing Equipment," an eight-page bulletin discussing the company's line of laboratory and production equipment as well as its new flour refining system, is available from Sturtevant Mill Co., Boston, Mass.

► Imperial Commodities Corp. is now conducting all of its rubber transactions through its wholly owned subsidiary, Alan L. Grant Co., Inc., 1 Liberty St., New York 5, N. Y.

► "A New Link with Your Company's Future" is the title of a brochure which describes the new Technical Service Center now being built by Naugatuck Chemical, Naugatuck, Conn.

► Flexible Tubing Corp. has opened a sales and engineering office, headed by F. Richard Krabbe, senior sales engineer, which is located at 9216 Clayton Rd., St. Louis 24, Mo.

► A 16-page catalog, No. JWL-100, describing processing chemicals of its subsidiary, Jacques Wolf & Co., has been published by Nopco Chemical Co., Newark, N. J.

► "Resins for Rubber", an illustrated booklet describing the use of Velsicol hydrocarbon resins, is available from the Velsicol Chemical Corp., Chicago, Ill. Ask for Booklet No. 505-3.

Royle Extruders Increase Room Temperature Feeding Efficiency

Those working with room temperature feeding are familiar with the many economic advantages this method offers.

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BOOKS for the RUBBER INDUSTRY

MICROSCOPY OF RUBBER

by C. H. Leigh-Dugmore $4.50

Although the electron microscope was developed barely 30 years ago, it has been applied to the study of rubber structure since 1940. The value of microscopy, however, depends as much on the experience of the microscopist in interpreting what he sees as on his ability to prepare specimens and operate his microscopes. This book helps the microscopist by showing him where and how to look for the needed experience. It covers all types of elastomers.

ANALYSIS OF RUBBER

by W. C. Wake $8.00

The first modern work devoted solely to this important subject to be published in English. In addition to an analysis of natural and synthetic rubbers, the author deals with polyethylene, polyvinyl chloride, polyvinyl alcohol and the polyurethanes. The identification of compounding ingredients used in these polymers is discussed. This work will unquestionably become a standard and is a "must" for all those concerned with the analysis of rubber polymers.

ENGINEERING DESIGN WITH RUBBER

by A. R. Payne and J. B. Scott $8.00

Among the most important works of its kind, this book covers (among others) the following subjects: The Rubberlike State, Dynamic and Related Time-Dependent Properties of Rubber, Dynamic and Related Test Methods and Machines, Force-Deformation Relationships in Rubber Units, Resonance and Transmissibility, Practical Design Details, Use of Rubber in Engineering, Collaboration Between the Engineer and the Rubber Technologist.

CONDUCTIVE RUBBER

by R. H. Norman $3.50

This book covers the production, application and test methods of and for conductive rubber. It surveys a whole mass of results and presents the main conclusions in a form which can readily be used by the rubber manufacturer. It deals extensively with the conductive and anti-static classes of rubber. The effects of time, stress and other variables on resistivity are covered. A complete index is provided. One of the practical RABRM manuals.

Please send me the following books:

- ☐ Microscopy of Rubber, $4.50
- ☐ Analysis of Rubber and Rubberlike Materials, $8.00
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All coated fabrics described processed by **Aidan Rubber Co.**, Philadelphia.

The rugged, warm DUXBAK® hunting coat is lightweight, yet highly waterproof and windproof. A SYNPOL rubber resin lines and bloodproofs this jacket's expanding game pocket. SYNPOL guards against moisture, is permanently flexible.

New, fast pastel colors is the powerful sales secret of American Rubber Sales Company's line of marbleized and flecked terrazzo pattern rubber floor tile. SYNPOL offers such remarkable color characteristics that users can now enjoy all the resilience, durability, and economy for which rubber tile is outstanding, with truly superior color effects.

TEXUS

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Consider the "good news" possibilities SYNPOL SBR Rubbers offer your product... present or proposed. Choose from the widest line of SBRs in the industry. Enjoy the product and processing advantages resulting from unusually rigorous quality controls. Discover the difference a SYNPOL can make.

Among the 30 SYNPOLS that can save you money and boost your product performance in these and other applications are:

SYNPOL	HOT TYPES			COLD	OIL-EXTENDED
	1001	8000	1061	1502	8209
DESCRIPTION					
Emulsifier	Fatty Acid	Fatty Acid	Fatty Acid	Mixed Acid	Mixed Acid
Stabilizer	Slightly Staining	Non-Staining Non-Discoloring	Non-Staining Non-Discoloring	Non-Staining Non-Discoloring	Non-Staining Non-Discoloring
Coagulant	Salt Acid	Salt Acid	Salt Acid	Salt Acid	Alum
Polymer					Polymer—100 pts.
Oil					NAPH—25 pts.
PROPERTIES					
CHEMICAL	Specifications	Specifications	Specifications	Specifications	Tentative Specifications
Volatile Matter % wt.	0.50 (Max.)	0.75 (Max.)	0.50 (Max.)	0.75 (Max.)	0.75 (Max.)
Ash % wt.	1.50 (Max.)	1.50 (Max.)	1.50 (Max.)	1.50 (Max.)	1.25 (Max.)
Organic Acid % wt.	4.00—6.25	4.00—6.00	4.00—6.50	4.75—7.00	4.50—6.30
Soap % wt.	0.75 (Max.)	0.50 (Max.)	0.75 (Max.)	0.50 (Max.)	0.10 (Max.)
Bound Styrene % wt.	22.5—24.5	42.0—45.0	22.5—24.5	22.5—24.5	33.5—36.5
Stabilizer % wt.	1.00—1.75	1.25 added	1.25 added	1.25 added	1.25 added†
PHYSICAL	Specifications	Specifications	Specifications	Specifications	Typical Production Values
Specific Gravity	0.935	0.965	0.935	0.935	0.950
Raw Viscosity, ML-4′—212° F.	44—52	40—50	44—52	46—58	50
Cpd. Viscosity, ML-4′—212° F.	73 (Max.)	65 (Max.)	73 (Max.)	73 (Max.)	46
Tensile psi 50′	2500 (Min.)	2500 (Min.)	2500 (Min.)	3100 (Min.)	3620
Elongation % 50′	500 (Min.)	550 (Min.)	500 (Min.)	575 (Min.)	650
Modulus psi 25′	325—625	300—700	325—625	350—650	510
Modulus psi 50′ 300% Elongation	750—1100	775—1175	750—1100	700—1150	1090
Modulus psi 100′	1200—1600	1400—1900	1200—1600	1150—1650	1210
Water Soluble Ash % wt.					
Water Absorption mg./sq. cm.					
TEST RECIPES[1]					
Polymer or Masterbatch	100.00	100.00	100.00	100.00	100.00
EPC Black	40.00	40.00	40.00	40.00	40.00
Zinc Oxide	5.00	5.00	5.00	5.00	5.00
Sulfur	2.00	2.00	2.00	2.00	2.00
Benzothiazyldisulfide	1.75	1.75	1.75	2.00	2.75
Stearic Acid					1.50
REMARKS	General purpose hot rubber which is more resistant to staining and discoloring than 1000.	A very light-colored, high styrene (43.5 parts) polymer. Non-staining and non-discoloring. A modification of 1013.	A non-staining non-discoloring polymer stabilized for maximum resistance to breakdown and gel formation during milling.	Non-discoloring and non-staining cold rubber. Higher physicals than 1006 and 1061.	An oil-extended cold polymer offering excellent physical properties, light color, good processability and economy.
APPLICATIONS	Tires, molded and extruded mechanical goods, shoe soles & heels.	Calendered goods, closures, can sealants, adhesives and molded goods. Designed for applications requiring high green strength and excellent flow characteristics.	Light-colored & white products such as white sidewall tires, shoe soles, floor tile, toys, hospital sheeting, sporting goods, high-impact styrene.	Light-colored & white products such as white sidewalls, light mechanicals, floor tile, hospital sheeting, toys, soles, heels, food conveyor belts, high-impact styrene.	Floor tile, shoe soles and heels, cable jacketing, battery boxes, steering wheels, household goods, bowling balls, coated fabrics.

[1]The figures given are parts by weight of NBS Standard Compounding Ingredients. Press cure at 292° F.

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As Ken Soule Sees It

by Kenneth J. Soule

What's Cooking And How?

In the February, 1961, issue of RUBBER AGE, we had occasion to comment on a brand new "greaseless" fry pan just being introduced into the United States from France. It is made of aluminum, with the cooking surface consisting of a built-on layer of DuPont Teflon. Extensive claims have been made for the expensive product.

Since that time, the housewares industry and the general public alike have apparently become considerably interested in "non-stick" cooking ware in all of its numerous ramifications. In general, these fall into two classifications: (1) sprayed-on silicone coatings, and (2) Teflon-lined ware. The silicone-coated items appear to be a minor matter as far as factory-made utensils are concerned. This type has also progressed into the do-it-yourself class. This has come about with the introduction by American Machine & Foundry Co., (and perhaps others) of a push-button dispenser for home application of a silicone coating. After a 45-minute oven bake, the coating is said to last in use for months.

The Teflon-lined utensils, on the other hand, seem to have generated pandemonium in the housewares industry and a still undetermined amount of enthusiasm among the consumer public. A double page spread in *Today's Living,* entitled, "The Hubbub Over Non-stick Cookware," by Eleanor Adams and Isabel A. McGovern, points up the importance attached to the entire subject. According to this report, *non-electrical* cooking vessels of various kinds are now being produced with Teflon linings by more than twelve American manufacturers. All are sold with a special spatula of either wood or rubber, which the directions say *must* be used at all times. The Teflon lining is very effective in permitting frying with little or no fat, and the utensil cleans up with practically no effort.

The chief trouble with the coating is that it must be babied. No cutting is permitted in the pans. Heat must be kept moderate, and overheating when the utensil is empty is strictly taboo. In addition, any use of scouring powder or abrasive, such as steel wool, etc., will permanently damage the surface. It also appears true that, after extended use, the Teflon coatings discolor badly and look quite unattractive.

It is because of these use hazards that not a single big-name electrical manufacturer has so far come out with any Teflon-lined product. All have shied away for fear that sad experiences with Teflonized equipment (even though due to customer abuse) would adversely affect their good name on other products. Thus, the field has been left to numerous smaller electric companies—who have less to lose. Miss McGovern confines herself chiefly to assaying the virtues and failings of the Teflon-coated equipment as disclosed in extensive tests in her *Herald-Tribune* kitchen, and also in reporting the findings of other culinary experts. In general, it was often found desirable to use a little fat or to use a lid on the pan to produce moist, attractive-looking fried foods. Unquestionably, the treated cookware cleans up very readily. It was felt, however, that the claims as to "healthful — and finest cooking method" were gross exaggerations, and that results as good or better could be obtained by conventional methods—at a very considerable saving in the cost of the cooking equipment.

So there the matter stands! In this unquestionably woman's world, mere man can only say plaintively,

"No matter *what* it is cooked in, please—keep that delicious food rolling from our home kitchens!"

Balm for Golfers

In our area, Summer and its Indian counterpart have slipped stealthily away, and the first frosty breezes of Autumn warn of the inexorable approach of Winter. To those golfers, who for one reason or another cannot take off for milder climates, it becomes a period of intense sadness. No more divot digging, no more struggling with par, your conscience, and your skeptical opponent. In short, an aching, golf-less void stretching ahead for at least four long and dismal months.

But now that has all been changed. Gloom-ridden golfers can again take heart. Science and the best engineering brains of the country have combined to produce a gadget by means of which free swinging golf can be played indoors all winter long. This mechanical marvel is officially known as an "Electronic Golf Computer," and is manufactured by Electronic Recreations Inc., St. Louis, Mo. In this area it is on exhibit and for sale by Hammacher Schlemmer, New York, N. Y.

As described and illustrated in a four-page brochure, the machine consists essentially of three parts: the electronic tee, the target, (made of heavy duty-fine-weave belting), and the console, which houses the electronic measuring and recording units. The tee and the target are set up exactly 13 feet apart, and both are connected by electric cables to the com-

puter console. This, by the way, looks like a panel board at a tracking station. The rubber tee, incidentally, is mounted in a heavy two-piece rubber pad, containing an insert strip of reversible green tire matting.

In use, the eager golfer takes a full swing at the ball from the tee. The "Computer" indicates, instantly and automatically, how far the drive has traveled on the fairway, (up to a maximum of 340 yards.) Data is also recorded as to whether the drive would have sliced, hooked, or gone straight down the middle.

Sounds like Manna from Heaven, except perhaps for two tiny flaws in the tissue of this Elysian dream. One is the need to find a 9′ by 12′ parking space for your mechanical marvel where the ceiling is high enough to permit a full golf swing. (No doubt you can requisition the living room or the garage for a few hours each day.) For some, the other slight obstacle, is the quoted price, $1595. (A second mortgage on the house could readily take care of this!) FORE—Everyone!

Flameproof Rubber

A great many attempts have been made, over the years, to render natural rubber flameproof, or at least to make it more flame resistant. Some limited success has attended these efforts, which relied chiefly on compounding with combustion retarding materials such as chlorinated hydrocarbons, various ammonium salts, and selected metallic oxides. The chief drawback to all these experiments was that such excessive amounts of modifying materials were required that the physical properties of the resulting compounds were adversely affected.

Now the Natural Rubber Producers' Research Association has taken a new look at the problem, and has achieved considerable success in its preliminary work. The method used and the results obtained are described in an article by T. D. Pendle of the NRPRA in the current issue of *Rubber Developments*. The unique approach used in this work involves "the chemical modification of natural rubber, so that flame resistance is built into the rubber molecule." This is brought about by reacting natural rubber latex with trichlorobromomethane ($CBrCl_3$) which adds to the double bonds of the rubber. Thus, four halogen atoms combine with one double bond, and it is possible to produce rubbers with reasonably high halogen content but still maintaining a high percentage of the rubber double bonds.

For example, one of the new rubbers containing 20 per cent by weight of combined $CBrcl_3$ and 80 per cent rubber (known as FR 20 rubber) is still 90 per cent unsaturated, and can therefore be vulcanized in the same manner as regular natural rubber. Other modified rubbers, with still higher halogen content, have also been produced, but in general the lowered physical properties of such rubbers make their use undesirable.

The article describes several different methods of testing flame resistance, and outlines the results obtained comparing natural rubber and a number of modified rubbers. It is shown that the new rubbers are unquestionably flame resistant or even flameproof. At the same time, while there has been some loss of tensile strength or compression set resistance, the change in physical properties does not appear to be serious. Suggested uses for the new rubbers are in the "bonding of hair pads for upholstery and packaging, and in the production of latex foam." Compounds illustrative of both uses are outlined, and test values given.

From the data shown, it would appear that the NRPRA has achieved notable success in a difficult field, and deserves hearty congratulations on a job well done!

Anti-Freezes Again

The weather may not feel much like it, but automobile radiator coolants are in the news again. As in 1960, Dow's "Dowgard" and DuPont's "Telar" are teeing off once again against Union Carbide's familiar "Prestone" for the motorist's antifreeze business.

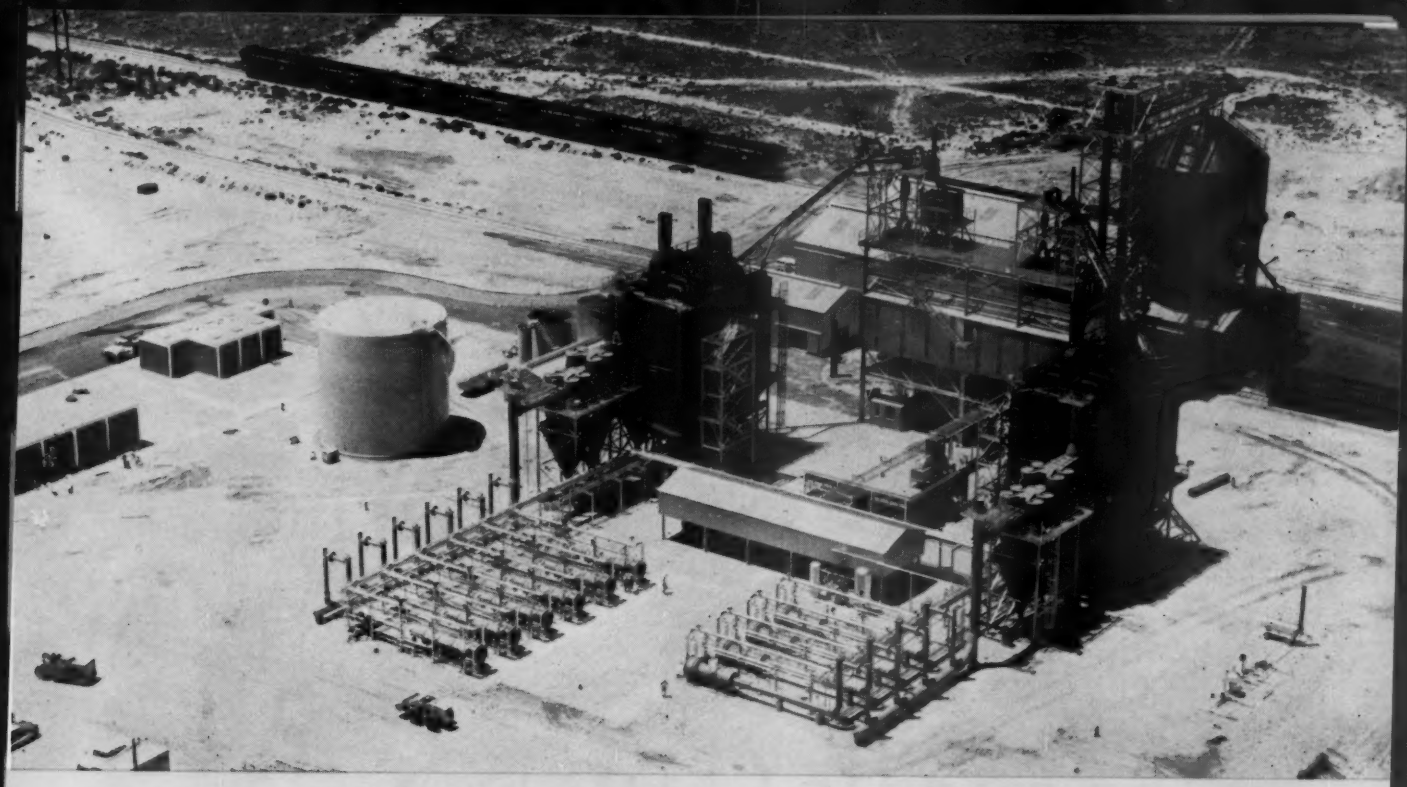
As you may remember, the Dow and DuPont products claim the added virtue that they can (in fact, *should)* be left in the radiator as a year-round protective. One even states that it will "outlast your car!" (Could the new buggies be that bad?). Added impetus may (or may not) be given to their sales story by the fact that Ford and American Motors are said to have decided to install "extended life" type coolants in their 1962 models.

As of this writing, neither General Motors nor Chrysler has reported any decision as to what they will do in 1962. Perhaps they are waiting to see whether the general public goes for the year-round products, or stays loyal to the old established types. Have you made up your mind?

Baseball Note

It may seem a mite late in the season for a baseball item, but since the Hot Stove League is always in session and since the quote may also appeal to any distaff ball fans, we offer it without apology.

"If you can hold out for another week, Revlon will have mink eyelashes for $50 a pair. You can get three times as many mink hairs as human hairs in the same space, which makes the *batting* average that much better!" (From "Inside Fashion" by Eugenia Sheppard, Women's Feature Editor, *N. Y. Herald Tribune,* September 29, 1961.)!



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4. Readily absorbed without affecting the stock.
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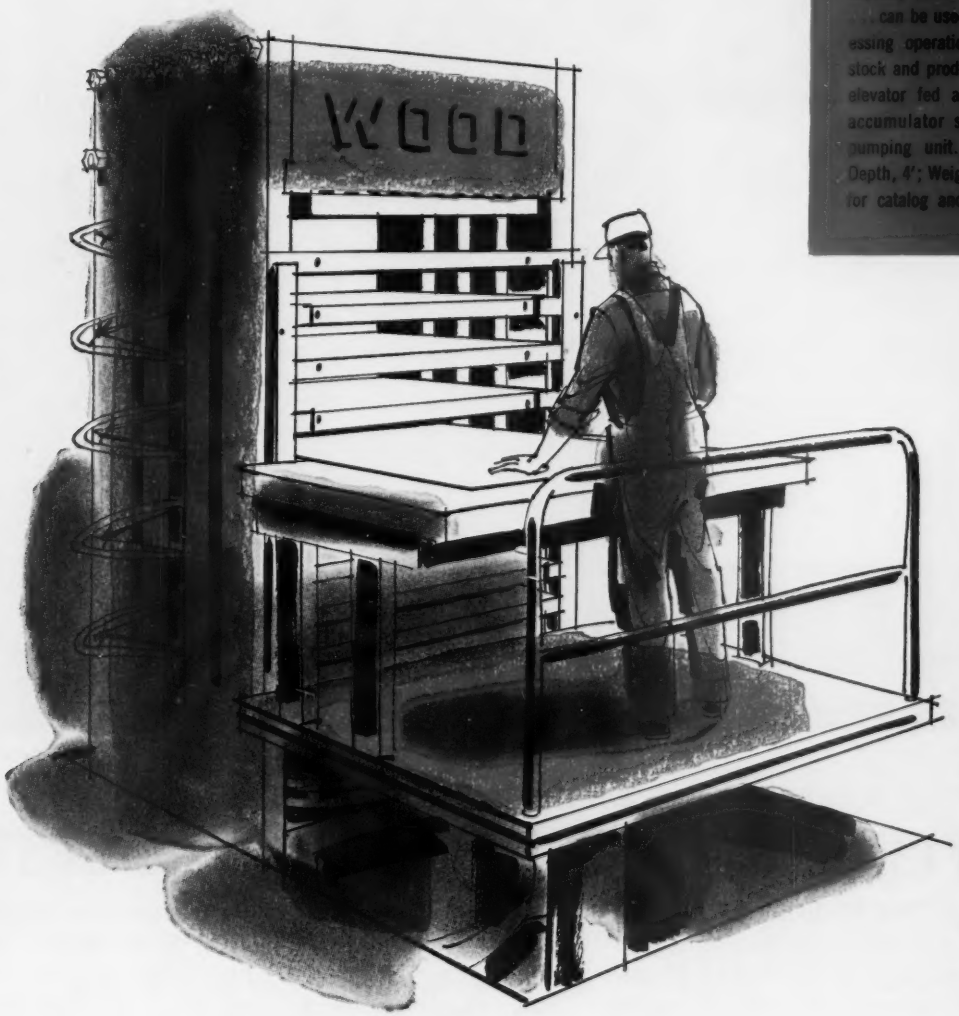

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BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

• **The Second Chemical and Petroleum Engineering Exhibition, Olympia, London, 20-30 June, 1962.** What is billed as the largest exhibition of chemical plant and oil refinery equipment ever held in Europe will take place in London next year with between 400 and 500 exhibitors occupying space.

The Exhibition is under the joint sponsorship of the British Chemical Plant Manufacturers Association and the Council of British Manufacturers of Petroleum Equipment. It will run concurrently with the 3rd Congress of the European Federation of Chemical Engineering. The 4th Congress of the Federation of European Petroleum Equipment Manufacturers will take place June 25-28 at Church Hall, Westminster. The exhibition itself will cover petroleum and chemical processing equipment, and will cover plastics, man-made fibers, resins, synthetic rubber, plus paints, varnishes, and adhesives.

• **French cis-Polybutadiene Operation.** The Societe des Elastomeres de Synthese, a French-American venture, has completed plans for its *cis*-polybutadiene plant. Licenses have been obtained under the French patents held by Goodrich-Gulf Chemicals, Inc., and Societa Montecatini of Italy. The French firm, already producing butadiene-styrene synthetic rubber, is jointly owned by the Shell interests, Texas Butadiene and Chemical Corp., and Campagnie de Saint-Gobain. Its facilities adjoin the French Shell refinery at Etang de Berre.

• **Rubber Industry Wage Position.** Data issued by the European Common Market's Statistical Bureau, and published in a recent issue of the German publication *Kautschuk und Gummi,* indicates that the relative position of the rubber industry has remained static over the period 1953-1959 as regarding the proportion of business capital per employee. Conclusion: apparently the rubber industry, as a result of its specific manufacturing processes, will not automatically become relatively more wage-intensive from year to year, although it, like other industries, has seen a rise in capital intensity.

• **Czechoslovakia Trades with Nigeria.** The Czechoslovakian news agency Ceteka has supplied information which throws light on the economic battle between East and West for both African loyalty and "dollars." In this instance, a long term agreement has been signed with Nigeria by Czechoslovakia under which Nigerian rubber, among other goods, will be received in exchange for machines and equipment, including complete industrial plants.

• **Hungary.** By 1965 tire production at the Budapest Rubber Works is expected to achieve an annual output of some 800,000 units, double the present production rate. Pál Somogyi, managing director, has reported that nearly $7 million are being spent during the remainder of 1961 on the first stage of an extensive reconstruction and expansion program.

While heavy industry plays a substantial role in any country undergoing industrial development, a report from Hungary also indicates that there, private craftsmen and small cooperating groups are producing nearly 10 per cent of its total output. This effort no doubt includes small-shop and home-production enterprises, not unlike those of the Japanese.

• **Romanian Tire Testing Plant.** Steel drums designed to impose stresses on the walls of off-the-road tires for earthmoving equipment have been delivered by an English firm to the Rustyfa Consortium as part of the equipment for a Romanian factory. The drums are designed to subject the walls of the tires to side-to-side strain. The tires are forced against the revolving eccentric drums by hydraulic rams. Speed of the drums can be varied.

• **Tire Equipment for Russia.** While politically England, France, the United States and West Germany are disagreeing over ways and means of solving certain international crises, trade, as always, continues. Word comes from the first-mentioned of these countries of a contract recently signed between Simon Handling Engineers Ltd., and the Soviet Trade Organization, Techmashimport. The contract, valued at over $5 million, is to supply complete machinery and equipment for handling, storing and automatic weighing of materials for a new Russian tire factory. Site for the plant is said to be at Voljsk, near Stalingrad.

The English journal, *Rubber and Plastics Weekly,* reports that this contract brings the total volume of business from Russia to the English engineering firm at beyond £2 million. Simon Handling Engineers is a member of the consortium Rustyfa Ltd. which recently supplied £14 million worth of engineering services, plant equipment, and rubber and tire manufacturing machinery to the Dneipropetrovsk plant near the Dneiper river in the Ukraine.

On the Continent (cont'd)

• **Americans in Stockholm.** An American scientist, Dr. S. D. Gehman, manager of physics research for Goodyear Tire & Rubber Co., reported in Sweden that improvement in abrasion resistance of tire compounds is a leading objective of present research and development activities in the rubber industry.

Dr. Gehman spoke at a symposium sponsored by the Stockholm Institute of Technology Alumni Association September 27. He commented that the world's motorists are wearing rubber off their tires at the rate of two billion pounds a year but that no other material could do as well. In describing the tests currently in use to measure rubber abrasion he stressed that reliable theories on the abrasion and wear of all non-metallic materials were as yet lacking. Such theories would benefit new product development and improvement of old products by shortening the time required to field-test wearing abilities. Existing laboratory tests do shorten the time it takes to send new products to market, Gehman explained, but results do not yet conform closely enough to actual use tests.

Three weeks later, a privately organized mission of about 70 business men from New Jersey arrived in Sweden to pursue possible tie-ins between the Southern part of their home state and the Swedish chemical industry. These Swedish companies are high on the list of potential builders for the region because of the vast petrochemical complex that exists in New Jersey and the Delaware Valley. (New Jersey is the top chemical producer in the U.S.)

Why should New Jersey be interested in Sweden? On the one hand, the southern part of the state was once known as New Sweden, having first been settled by Swedish colonists in 1638. On the other, Swedish industry is currently expanding its own horizons. The Swedish government recently informed its parliament that it planned to apply for association with the six-nation European Economic Community—the common market—"within the near future." Application is expected to be made this December. Switzerland and Austria, which like Sweden are neutral members of the Outer Seven or European Free Trade Association, are expected to apply at the same time.

• **Foam Manufacturing Cooperation.** While the market for foam in the United States seems to skyrocket from day to day, American companies with know-how and enterprise are not lax in exploring overseas potentials. For instance, Houdry Process Corp. of Philadelphia and Compagnia Internazionale Generale Industriale-Malatesta, S.P.A. have formed an equally owned Italian company, Montecassino, S.P.A. to manufacture polyurethane foam and foam products.

Concurrently, Lintafoam Industries Ltd. England, has reached an agreement with Reeves Bros. of New York to work together in exploration of patents and know-how in a company yet to be formed. The specific field of interest is that of textile/polyurethane foam laminations. Arrangements have been made to provide for extension of activities through the United Kingdom, Eire, Europe, South Africa, and the Commonwealth, excluding Canada.

• **Italian Rubber Exports.** A significant increase in Italian exports of synthetic rubber during 1960 has been reported by government officials. In comparison with 1959 total exports of 24,653 long tons, 1960 total was 36,979, a gain of 50 per cent. During the same period, Germany exported 21,079 l.t.; Great Britain, 19,700; Netherlands, 6,532 and France, 6,200. The increase in Italian exports are attributed by the Italian Institute Centrale di Statistica almost exclusively to strongly increased exports to the U.S.S.R., China, and other Asiatic countries.

• **Expansion in Scotland.** Acrylonitrile-butadiene-styrene polymers for sale in Great Britain and on the Continent will be produced at a new plant being built by Borg-Warner's Marbon Chemical division in Grangemouth, Scotland. The operation has the cooperation of Britain's Anchor Chemical Co., of Manchester.

Other recent English expansion plans reported include the following: Howards of Illford, Ltd., is planning construction of plants to make dicyclohexyl phthalate, cyclohexanol, and cyclohexanone.

Concurrently, an European chemical market research association has been predicted as the outgrowth of a recent meeting in London of 25 chemical representatives from seven European countries.

• **Soviet-Japanese Rubber Trade Agreement.** In November of 1960 the Japanese Synthetic Rubber Co. suspended production because of the large stocks it was holding in its warehouses. The Italian magazine *L'Industria Della Gomma,* in accounting for this, cites the noticeable difference in price between the Japanese product and its competitors on the world market. News has now been released of an agreement between this firm and commercial officials of the Soviet Union for the sale of 2,000 tons of styrene-butadiene rubber, an amount which constitutes the biggest export to date from Japan. According to Japanese sources, this is to be only the first of a series of larger sales that may be stipulated in a long term contract now in the planning stages.

• **Polish Construction.** Soviet natural gas will be the raw material for a large chemical complex being built at Pulawy, Poland. Most of the output of the center will be nitrogenous fertilizer but a PVC facility with an expected output of 200,000 tons in 1970 is also planned.

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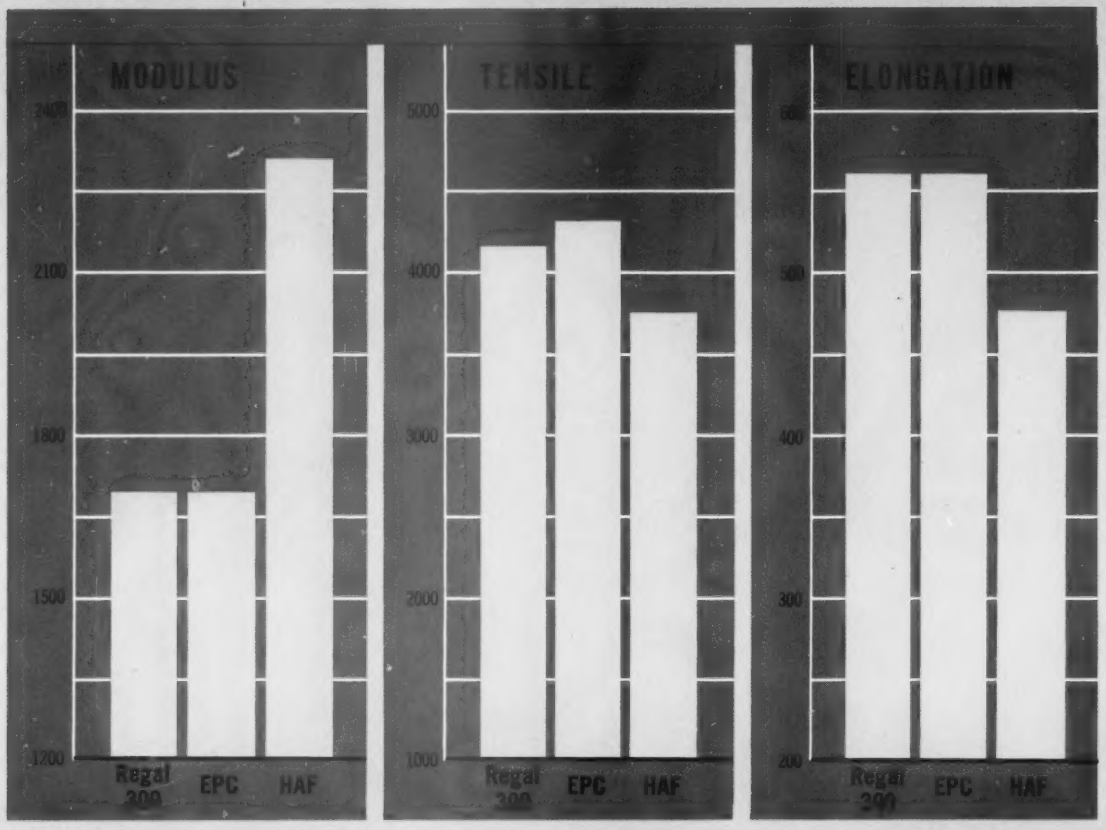

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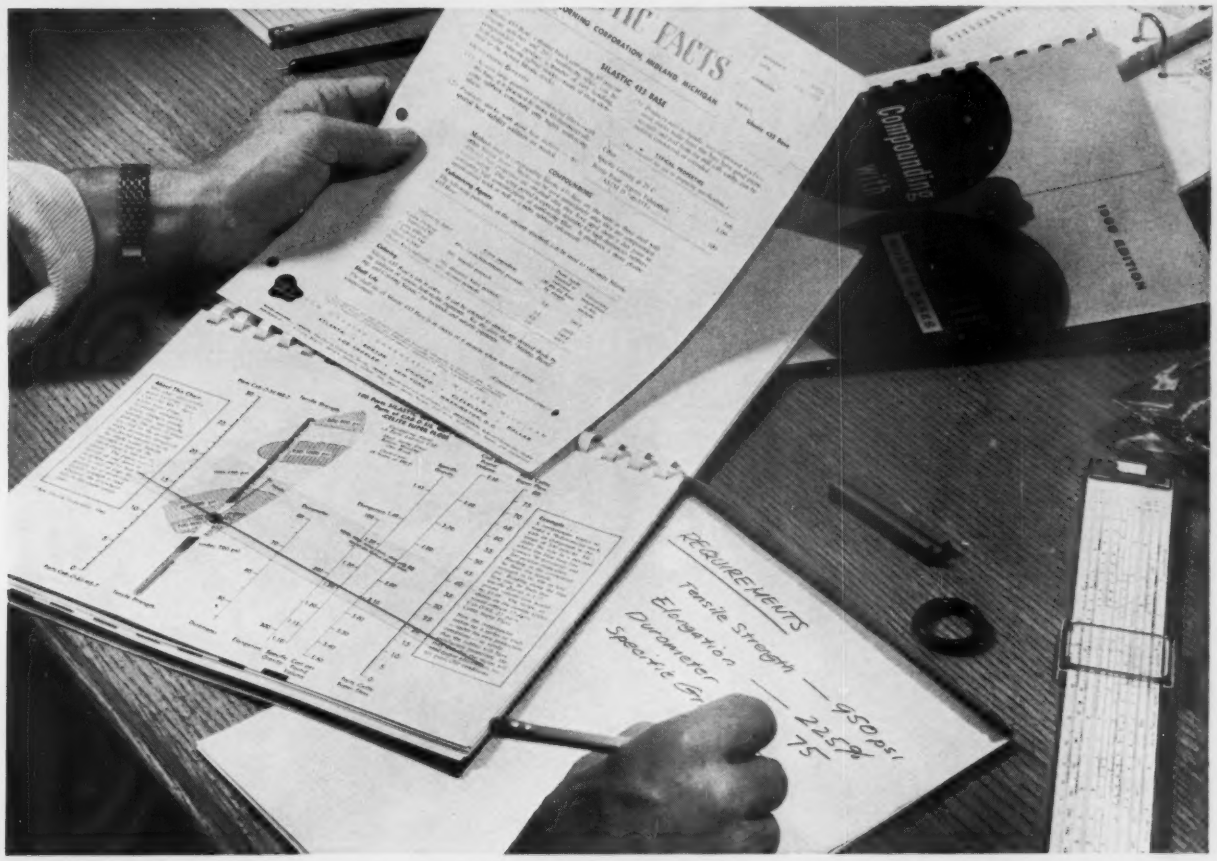

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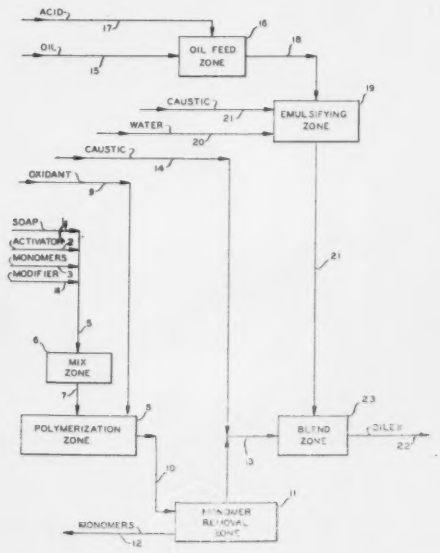
PATENT REVIEW

by Melvin Nord

Preparation of a Stable Oil-Extended Latex

U. S. Patent 2,970,125, issued January 31, 1961, to Bobbie H. Smith and Thomas J. Kennedy, assigned to the Phillips Petroleum Co., describes a method of preparing a stable latex-oil emulsion.

As shown in the figure, soap or emulsifier from conduit 1, activator from conduit 2, monomer from conduit 3 and modifier from conduit 4 are



passed via conduit 5 to the mix zone (6) where these ingredients are blended and emulsified. The resulting emulsion passes via conduit 7 to the polymerization zone (8). At this same time, an oxidant is admitted to the polymerization zone (8) via conduit 9. The latex formed in polymerization zone (8) passes via conduit 10 to monomer the removal zone (11) where unpolymerized monomers are recovered and returned to the polymerization zone via conduit 12. The monomer free latex leaves zone 11 via conduit 13 where caustic is added via conduit 14 to raise the pH to the desired level. The resulting high pH latex is then admitted to the blend zone (23).

At the same time the latex is being prepared, an oil emulsion is prepared by passing oil via conduit 15 to the oil feed zone (16). An emulsifying acid is admitted to the oil feed zone (16) via conduit 17. The resulting mixture is then passed via conduit 18 to the emulsifying zone (19). Also added to this zone are water via conduit 20 and caustic via conduit 21 in amounts

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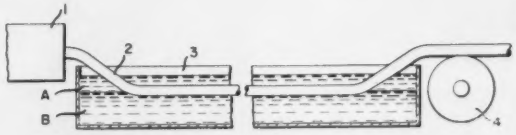
PATENT REVIEW

sufficient to completely neutralize the acid. The emulsion then passes via conduit 21 to the blending zone (23) where it is blended with the latex and the acid is completely neutralized by caustic in the latex. The latex oil emulsion is then sent to further processing steps (not shown) via conduit 22. The blend formed in zone 23 is stable and very little oil segregation takes place.

Curing Extrusions of Compounded Elastomers

U. S. Patent 2,971,221, issued February 14, 1961, to Melvin A. Schoenbeck and assigned to E. I. du Pont de Nemours & Co., provides a process for curing a continuous length of a compounded elastomer, such as an extruded gasket.

As shown in the figure, the assembly consists of the extruder (1) from which the compounded

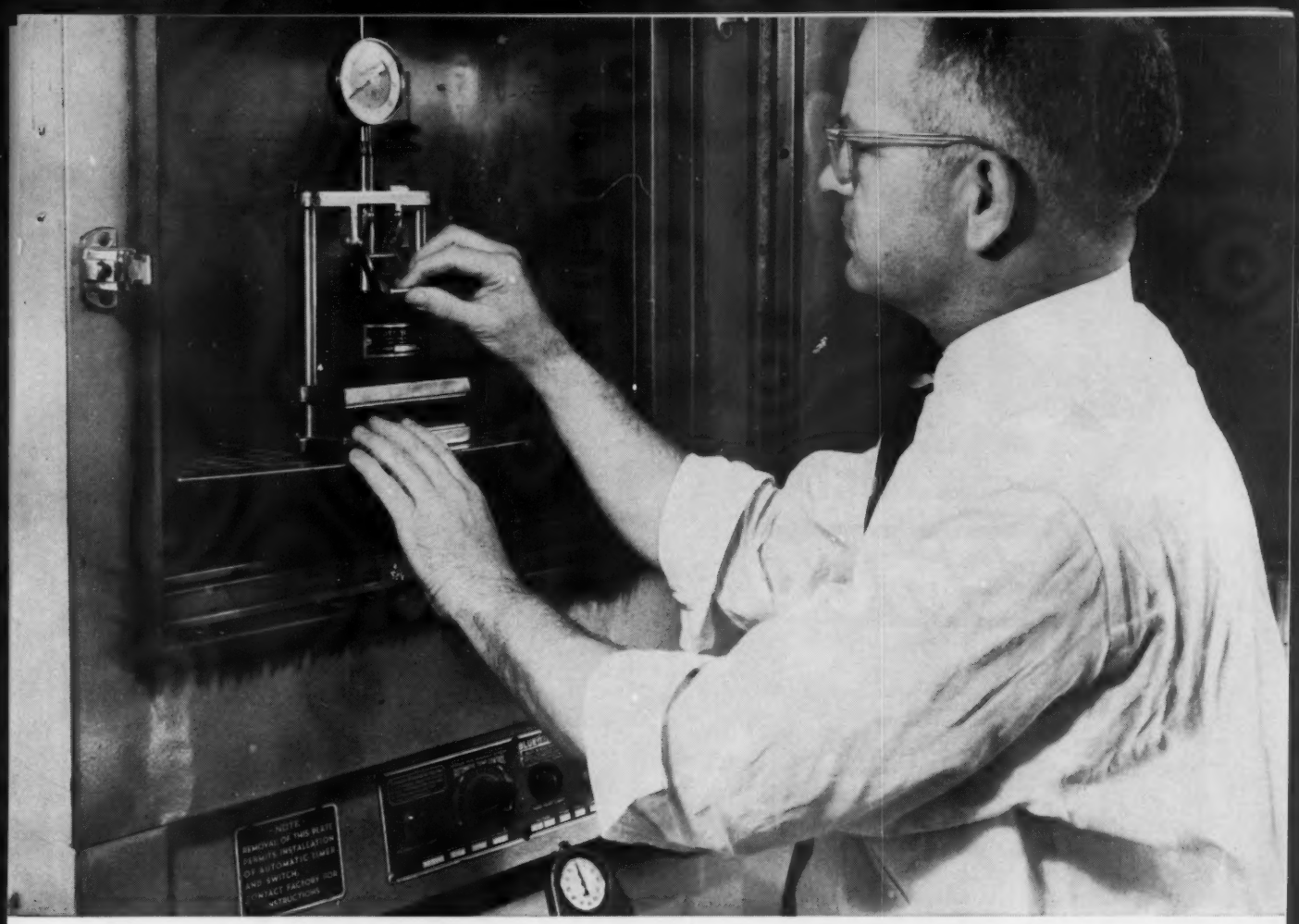


elastomer is delivered as a continuous extrudate (2) into the curing tank (3), a long, horizontal trough with closed ends. This tank contains two immiscible liquids as layers (A and B) with their interface approximately half-way between the bottom and top. The tank is heated electrically with strip heaters (not shown) applied to the outside of the tank throughout its length. The extrudate (2) floats at this interface without mechanical support and without the need of keeping it submerged. At the far end of the tank it is raised from the bath and removed by the traction roller (4).

Bonding Silicone Rubber-to-Metal

U. S. Patent 2,968,840, issued January 24, 1961, to Milton Morse, describes a method of bonding silicone rubber containing a substance capable of liberating benzoic acid under curing conditions to the outer surfaces of a metallic sealing device.

The method consists of: (1) forming a groove on the surface of the metal; (2) placing the device in a vented injection mold; (3) injecting the silicone rubber into the mold to fill the mold and the groove; and (4) curing the silicone rubber for ½ minute at 200° to 260° F. to liberate benzoic acid from the rubber except that portion in the groove where partial depolymerization is effected. This partial depolymerization forms a tar-like adhesive, bonding the rubber in the groove.



Dr. W. J. Wald, a Neville Senior Scientist, places a rubber sample in a plastometer in Neville's new rubber laboratories.

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PATENT REVIEW

Isoprene Preparation

U. S. Patent 2,967,897, issued January 10, 1961, to Dexter B. Sharp and John R. LeBlanc and assigned to Monsanto Chemical Co., describes a process for preparing isoprene from an isopentene. The first step consists of photoxidizing 2-methyl-2-butene in the presence of a photosensitizer to 2- and 3-methyl-3-buten-2-yl hydroperoxides. The hydroperoxides are then reduced to 2- and 3-methyl-3-buten-2-ols, and the unreacted 2-methyl-2-butene is separated from the reaction mixture and recycled to the photoxidizing procedure. The buten-2-ols are then dehydrated to isoprene.

Other Patents of Interest

Subject	Inventor or Assignee	Patent No.	Date
Tire buffing machine	Gordy Tire Co.	2,961,039	11/22/60
Apparatus for molding tires	Dunlop Tire & Rubber Corp.	2,961,702	11/29/60
Pneumatic tire	Frank O. Skidmore	2,962,072	11/29/60
Discharge door for rubber mixers	Farrel-Birmingham Co., Inc.	2,962,186	11/29/60
Polyurethane rubber compositions	Union Carbide Corp.	2,962,457	11/29/60
Apparatus for molding flashless rubber articles	Goshen Rubber Co., Inc.	2,962,761	12/ 6/60
Machine for tire manufacture	McNeil Machine & Engineering Co.	2,963,737	12/13/60
Apparatus for molding a seamless annular tread band	General Tire & Rubber Co.	2,963,743	12/13/60
Tires and tread stock composition	General Tire & Rubber Co.	2,964,083	12/13/60
Double-chambered tire	Irl Tubbs	2,964,084	12/13/60
Butadiene copolymer rubber-silica masterbatch	United States Rubber Co.	2,964,490	12/13/60

Copies of any patents, including those described here, are available from the Commissioner of Patents, Washington, D. C., for 25 cents each.

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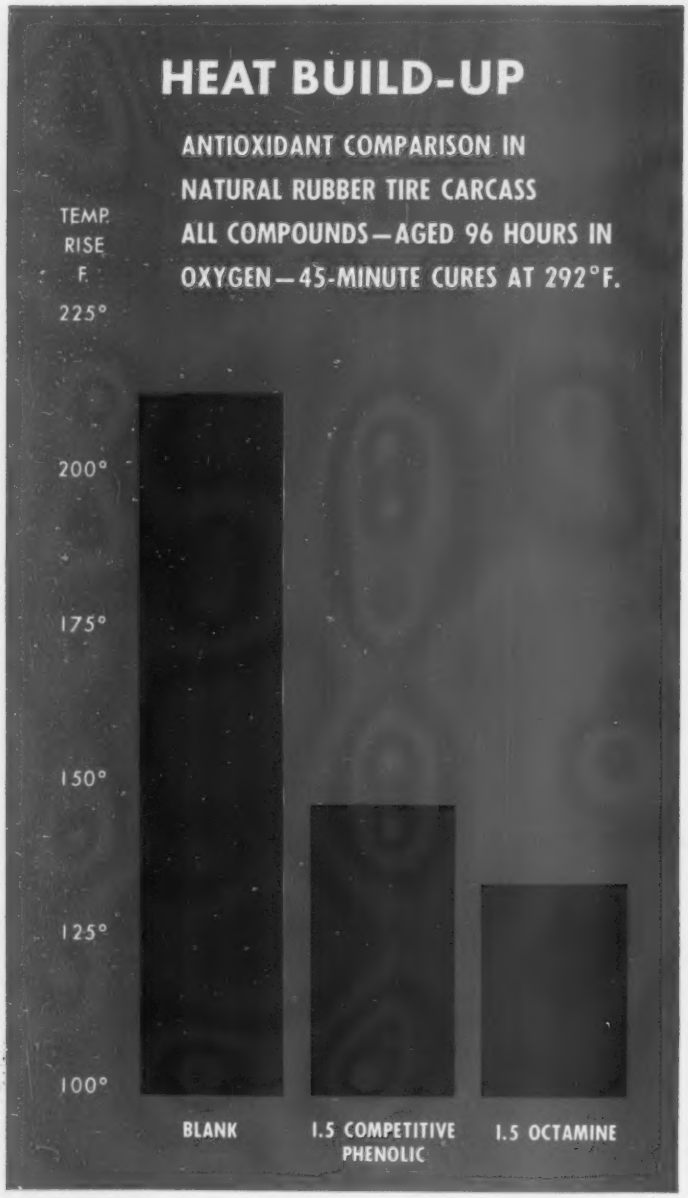

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Injection Molding of Rubber

Compound modification, and control of both plastication and injection, make it possible to achieve precise, high-speed production

By E. W. HOLLIS

President, Holtech Corp.
Gardena, California

THE injection process of molding rubber introduces a plasticized elastomeric compound into the closed cavities of a mold through pressure. The source of this pressure, external to the action of the mold and the mold clamp, is one of the characteristics distinguishing injection molding from transfer molding. In transfer molding both the plasticizing action and the movement of the material into the mold cavities are functions of the mold itself and the closing force of the mold clamp.

The Injection Molding Machine

By having both the plasticating and injection actions independent (see Figure 1), several variables which were previously difficult to correlate with a desired value, or to place in a desired sequence, come under control. Such control permits a logical selection from a wide range of available adjustments and makes it possible to achieve a desired balance for optimum cycle and molding characteristics.

From practical and economic viewpoints, the injection process also makes possible greatly reduced cure times (a result of controlled heat input) and machine-control of reliability and uniform quality of product. Each of these features, of course, has an effect on molding cost.

In common with all molding presses, the injection molding machine incorporates, as one of its main functions, actions for opening and closing the mold plates. For simplicity's sake let us say that any mechanism for clamping and unclamping the mold halves with sufficient restraining force to hold the mold closed during the injection period will suffice for this function. Any one of many clamping actions may be used, the final choice being related to the application and product being molded.

The great difference between this and other commonly used methods of molding rubber, however, is the mechanism for plasticizing the compound and then flowing it into the mold cavities. While some success has been achieved with screw-flight or extruder types of injection action, it is believed that the reciprocating ram and cylinder mechanism is the only practical means of gaining the temperature control and pressure versatility required for use with a wide range of compounds, part sizes and configurations.

The Injection Cylinder

In its dual action the injection cylinder must first be capable of imparting heat to the compound as it is fed into the throat of the cylinder. Since most rubber compounds become less viscuous and more flowable (see Figure 2) as their temperatures increase toward the cure point, the ideal plasticating action would increase the temperature of the compound from ambient—at the feed intake—to the exact cure temperature at the instant the cavity is completely full and under pressure. This is not practical in most

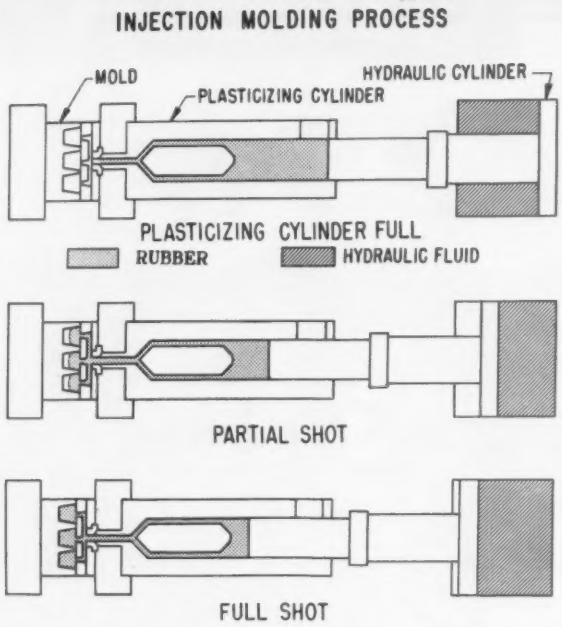


FIG. 1—Action of cylinder and mold during injection.

cases, however, because of the risk of pre-cure inclusions in the cavities, and because of the risk of partial or complete cure occurring in the plasticating chamber.

Thus a compromise temperature is selected, usually on a trial and error basis, which will give satisfactory flow behavior within the available pressure range, yet allow sufficient safety from partial cure to permit normal service to the mold and machine on a regular cycle. It is normally desirable to operate at the highest safe cylinder temperature because of the favorable effect of low viscosity on injection pressure, as well as the shorter time required for the mold surfaces to transfer the additional heat necessary to vulcanize the material in the cavity.

Even so, it is common to achieve, in one-eighth to one-tenth of the time normally required for the same part in a conventional compression operation.

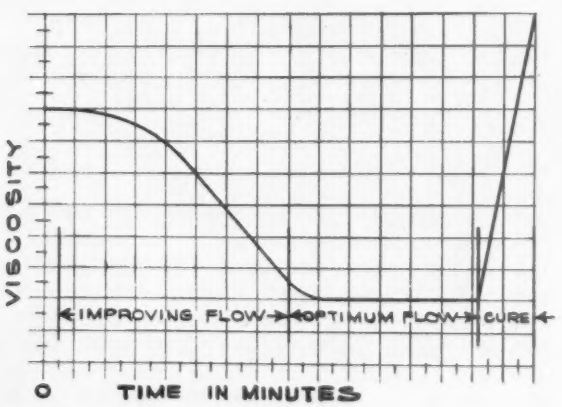


FIG. 2—Representative viscosity curve of rubber compound as taken by a Mooney viscometer.

Factors influencing the highest cylinder temperature that can be safely used are:

Mooney Scorch value, which can indicate the period of time a given compound may be exposed to the cylinder temperature without risk of premature curing.

Shot Size for the mold, which, when related to the total operating cycle, will indicate the period of time a unit of compound would be exposed to the cylinder temperature as it passes through.

Viscosity Desired, for optimum flow and filling of mold cavities. Normally the greatest obtainable degree of flowability is desired, but not in all cases.

Shear Strength of the compound in the uncured state, which affects the amount of thixatropic heat (heat of extrusion) the compound will pick up as a result of the force used to inject it. This may be great enough to require a reduction in cylinder temperature to avoid scorch in the cavity.

Considering these variables, it is understandable that the determination of optimum cylinder temperature, for a specific compound, must be made by empirical test. Once established, the result will be repetitive to the degree that the compound is repetitive from one batch to the next.

The injection pressure required to move the compound from the plasticating cylinder through nozzle, sprue, runners and gates into the mold cavities will also vary over a substantial range depending upon the temperature and plasticity of the compound and upon the time desired to accomplish the injection action.

Since there are hydraulic frictions and pressure drops occurring cumulatively all along the path of flow, as well as some transition from the fluid to the solid state as cure takes place on the hot mold surfaces, it is difficult to determine pressure at any point other than at the face of the injection ram. For this discussion, all pressures are those calculated at the ram face.

For general purpose molding, an available pressure range from 5,000 to 25,000 psi at the ram face is desirable and will be adequate for most compounds having a Mooney plasticity up to 65. The injection pressure should be readily adjustable because it is probably the most important single element in the control of the variables involved. Minor adjustment of the injection pressure will compensate for minor batch-to-batch differences in compound, will adjust for over or under filling of the cavities, and can be used to offset or strike a new balance when changes are made to cylinder temperature or injection time values.

The element of time of injection is also very important, not only for control of the amount of

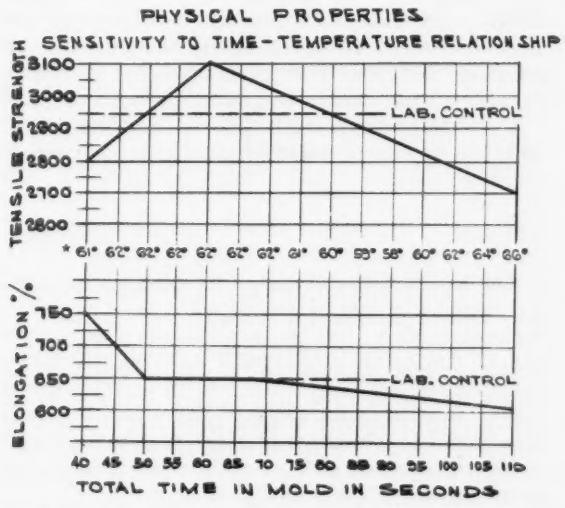
Injection Molding Cure Time

". . . It is common to achieve cures in one-eighth to one-tenth of the time normally required for the same part in a conventional compression operation . . ."

material that is forced into the mold cavities and the control of overfilling or underfilling, but also in the control of entrapped air, burn due to entrapped air and scorch which occurs as a result of frictional heats from too-fast movement of material. In this latter respect it would appear that the increase in frictional heat is as the square of the increase in velocity of the mass being injected.

Conversely, a rate of injection that is too slow will allow pre-cure to take place in the moving stream and will result in flow lines, orange peel surfaces or unfilled cavities simply because the mold heat cured the advancing front of material before the cavity filled.

Thus we are confronted with the well known triangle of conditions, temperature, time and pressure, (see Figure 3) and the necessity to strike and maintain an effective balance between them. A very effective control can be exercised if the temperature of the plasticating cylinder can be controlled within ±5° F. over a range of 100° to 220° F., the injection pressure can be controlled in increments of 500 psi over a range of 5,000 to 25,000 and if the time of injection can be controlled within tenths of a second over a range of 5 to 20 seconds.



* Durometer Hardness

FIG. 3—State of cure and sensitivity to time-temperature relationship of injection molded specimens compared with laboratory specimens. Compound: 62 Duro. GRS seal compound. Mold temperature: 360°F. ± 5°F., both cavity surfaces. All mold conditions constant throughout except time. Laboratory control slabs: 62 Duro., 2950 tensile, 650% elongation. (6 min. @ 320°F. in laboratory press.)

It should be remembered that with the fast cycles obtainable with the injection process where, as an example, an eight minute cure can be accomplished in one minute, the functions of air expulsion, complete filling to the configuration of the cavity and the build-up of heat to accomplish the cure are being greatly telescoped in time. This in turn requires a greater uniformity of compound to provide a known point of departure and a precise control of the factors which have a bearing on the state of cure.

Compounding for Injection Molding

The most common question advanced by molders contemplating the use of the injection process concerns the adaptability of existing compounds. It is proper that the question should be raised and that due consideration be given to the probability that some modification may be necessary, if maximum advantage is to be taken of the process. After all, the molding conditions are being altered substantially over those prevailing for which the compound was designed. Mold temperatures may be 40 to 100 degrees higher than with compression or transfer molds and the compound is being pre-heated to provide a much higher temperature plateau at the time it enters the mold.

Except in very insensitive compounds, these changed molding conditions would dictate some change in the cure characteristics of the compound.

In general terms, polymer type, Shore Hardness and physical properties have little direct effect on moldability. These factors may have side effects however, which should be considered in mold design and mold cleanliness.

The Mooney Scorch and Mooney Plasticity will indicate the suitability of a specific compound through its ability to flow and ability to endure the conditions of temperature encountered in the molding circumstance. As a rule of thumb, a Mooney Scorch of more than ten minutes (5 point rise at 250° F.) is safe. For reasonably short cycles, this time should be not greater than 20 minutes. Also, the ten point rise should occur within ten minutes of the five point rise.

At the same temperature, if the Mooney Plasticity is between 40 and 65, the compound may be expected to flow well enough to reach all parts of the mold. Under 40, some difficulty may be experienced with leakage at the nozzle. Over 65 the injection pressure becomes so great that the usable projected area of the mold is reduced below economic levels.

These generalizations automatically suggest the areas in compound construction which require the compounder's attention. Seldom is it necessary to look beyond the accelerator system and the plasticizers (or other elements affecting plasticity) to obtain the modifications that will give the best results for injection molding.

Accelerator Systems

Accelerator systems should consider the higher mold temperature and the need to raise the compound temperature in the plasticating cylinder to 175°-200° F. to obtain optimum plasticity. Also recognized must be the need to allow sufficient time to get the compound into the high temperatures of the cavity, then giving it a hard kick to go over to complete cure rapidly.

Thus it might be reasoned that the ideal injection compound would have a comparatively low level of primary cures but a somewhat higher level of retarding type secondary cures.

Stated differently, the trigger temperature of the accelerator system should be high enough to allow the compound to be pre-heated in the cylinder and to endure the frictional heats of being forced through sprue, runners and gates into the cavity. With cumulative input of heat uniformly distributed through the mass of material in the cavity, the secondary cures should take over for completion of cure with the heat made available by transfer from the cavity surfaces.

Because of the time-temperature relationship, the reduced amount of temperature rise required while the compound is resident in the cavity allows the higher temperature to be carried at the mold surfaces without the peril of surface scorch.

Plasticizers and processing aids may be necessary to obtain the flowability required to get the compound into the cavity, but once there their effect would appear to be all negative. That is, these elements of the compound formulation appear to be the principle (if not only) contributor to deposits and varnish in the mold, especially in compounds involving synthetic polymers.

Because of the wide variety of plasticizers (and combinations of plasticizers) in use, it is impossible to be specific in recommending a procedure to be followed. The temperature at which the plasticizer will degrade is probably the best index to its suitability: if it will degrade at a temperature within 100° F. of the anticipated mold temperature it may be expected to be troublesome in operation in an injection operation.

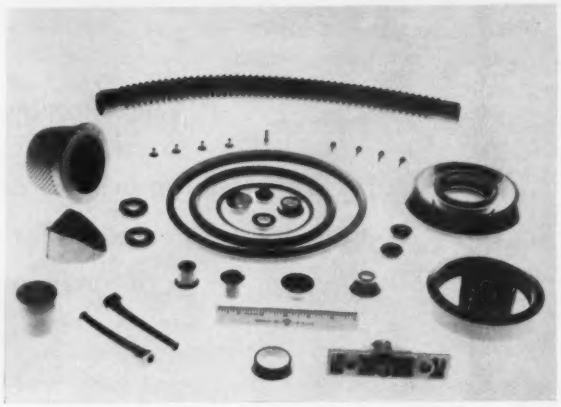


FIG. 4—Representative parts molded by injection:

Obviously, it is not economical to achieve fast molding cycles only to find that the gained time is dissipated in mold cleaning.

The design of molds for use in injection machines can vary from the very simplest standards of thermoplastic injection molding to a very high degree of sophistication resulting in completely flash-free parts which require no finishing or post-molding operations other than routine inspection. Both extremes are in daily use and each approach can be supported under certain economic conditions affecting the item being molded. Factors governing the choice of design are primarily economic rather than functional, related to quantity to be produced, quality of finish required, cost of obtaining that finish by usual finishing methods and the degree of material utilization required in the job.

Conclusion

The feeling that extremely high volume is required to support the use of an injection machine is not necessarily true. To be sure, a long and uninterrupted run on a single mold can be a desirable situation and will permit the cost of a higher quality mold. But the cycle speed of the injection process also works to advantage in short runs by permitting a fewer number of cavities in the mold to produce a given number of parts in a given time.

It is safe to say that, while not a cure for all of the situations which confront the molder of mechanical rubber goods, the injection process has a place in the operation of most versatile molding shops. For many types of products, some of which are shown in Figure 4, it will make the more conventional methods of molding economically unfeasible.

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Part VIII: Effect of Carbon Black and other Fillers on the Radiation Resistance of a Nitrile Elastomer

THIS is the eighth in a series of articles concerning the effects of ionizing radiation on the physical properties of elastomers and some rubberlike plastics materials of construction. Data and discussion are presented showing in general how radiation affects the physical properties of a nitrile (acrylonitrile-butadiene copolymer) elastomer loaded with different amounts of various types of fillers. All of the compounds were exposed to gamma radiation in air at 25°C. and normal atmospheric pressure to doses ranging up to 5×10^8 r.

Previous articles *(1-7)* in this series have presented background information on the subject of radiation damage to organic polymers, outlined the method of measuring physical properties, presented some sections concerning basic considerations, shown how gamma radiation affects the physical properties of many classes of elastomers and rubberlike plastics, and have presented data on the effect specific variables have on the radiation resistance of elastomeric polymers.

Due to the many variables involved and the fact that all types of fillers were not included, no attempt here has been made to be all inclusive, but rather to present the data in the hope that it will be useful from the standpoint of engineering data as well as help contribute to a better understanding of how elastomers are affected by exposure to ionizing radiation.

Experimental Procedure

All materials were exposed to gamma radiation in air at 25°C. and normal atmospheric pressure and evaluated by recording changes in physical properties as described in the first article. For all irradiations up to 1×10^8 r, a 1×10^6 r/hr Cobalt-60 isotope source was used. In order to reduce the exposure time for the higher doses a 3.7×10^6 r/hr Cobalt-60 isotope source was used. Property changes resulting from the irradiation of the same material to any given total dose in the two sources agreed closely enough so that it can be assumed that experimental results obtained are independent of the two sources.

A medium high acrylonitrile material of approximately 66 per cent acrylonitrile and 34 per cent butadiene content was used for the studies reported here. It was felt that this material would be a typical representative of the nitrile family of elastomers and that radiation induced changes occurring to it would reflect those occurring in the whole class.

The formulas and cure schedules for the nitrile compounds studied here are given in Table I. This table also includes filler particle size and original properties for ready reference. The compounds described were selected on the basis of equal filler weights. Each type of filler was compounded at three different weight levels to give a range of loadings. Other nitrile compounds have previously been discussed in articles III and VI.

It should be noted here that the materials selected were based upon a standard nitrile formula and therefore are not necessarily representative of general utility or practical nitrile compounds in the sense of being suitable for use for everyday type of mechanical goods, etc. They contained an adequate cure system and filler but were not fortified to resist various environments; they were chosen strictly for radiation effects studies. That is, they were compounded with minimum ingredients in the hope that effects observed would be reflected to a large extent by the fillers. It was felt that the use of more complex compounds would result in the filler effects being masked out by effects from other compounding ingredients.

The data obtained from exposing the nitrile compounds listed in Table I to various doses of gamma radiation are given in Table II. This table shows original property values opposite zero radiation dose followed by per cent property changes resulting from the various gamma radiation exposures. Also shown opposite zero irradiation dose and under the Remarks column is the original color of each material. Significant color changes and other observations needing comment are also noted under the Remarks column opposite the particular radiation dose causing the phenomena.

The data presented in Table II show that all of the nitrile compounds become hard and brittle and exhibit tremendous increases in tensile strength (with corresponding complete loss of elongation) on prolonged exposure to ionizing radiation. In all instances the hardness increases and the elongation decreases continuously as the radiation dose is increased. The tensile strength, on the other hand, does not follow a consistent pattern of behavior from one type of compound to another.

It has been previously noted *(3, 6)* with other nitrile compounds, that the tensile strength is either continuously raised or goes through varying degrees of maximums and minimums as the radiation exposure is increased. This is also true in the present instance with respect to tensile strength changes. There is no definite trend either between nitrile compounds with varying amounts of the same filler, or between nitrile compounds with the same amount of different fillers. Therefore, with respect to this filler study, the discussions to follow will be primarily concerned with tensile strength. Hardness and elongation will be mentioned as necessary to emphasize specific trends or observations.

The discussion to follow is based upon per cent change of tensile strength data given in Table II from which actual tensile strength values can be computed. The tensile strength of the various nitrile compounds does not follow any particular trend or pattern in the sense that data from one or two of the materials could be used to predict the behavior of others. This applies to both materials with varying amounts of the same filler, and to materials containing equal amounts of different fillers.

For example, the three compounds containing different amounts of the EPC carbon black were affected in essentially the same manner. The tensile strength was lowered to about the same percentage decrease before assuming an increase as the radiation exposure was increased. On the other hand, the effect of radiation on the tensile strength of the materials containing the titanium dioxide was a function of the amount of filler. As the amount of titanium dioxide was increased the tensile strength exhibited greater decreases before rising at the higher exposures.

Figure 1 illustrates the random behavior of the tensile strength of the three MT carbon black compounds on a per cent change basis. Property changes of a nitrile elastomer loaded with varying amounts of FEF carbon black have previously *(5)* been given which also show the varying behavior of the tensile as filler loading and radiation dose are increased.

As noted above, all of the fillers did not behave in the same manner with respect to their influence on the radiation-induced changes in a nitrile elastomer, particularly with respect to tensile strength. This is not in agreement with the data obtained on neoprene (unpublished data) where it was found that all of the fillers behaved in much the same manner. It is extremely difficult to compare the merits of the fillers

Base Compound in Parts by Weight	
Hycar 1002	100.0
Zinc Oxide	5.0
Stearic Acid	1.0
TMTD	3.5
Filler	see below

TABLE I—FORMULATIONS OF NITRILE ELASTOMERS USED FOR GAMMA IRRADIATION STUDIES

(All compounds cured 30 minutes at 310° F.)

Material Hycar 1002	Filler Type	Filler Weight	Filler Volume	Filler Size*	Hardness Shore A	Tensile psi	Elongation %
B-11	MT Black	40.0	22.2	0.350	55	1160	590
B-12	EPC Black	40.0	22.2	0.029	65	3290	550
B-13	SCF Black	40.0	22.2	0.021	67	3840	550
B-14	GPF Black	40.0	22.2	0.051	59	1670	580
B-15	CF Black	40.0	22.2	0.023	62	2870	595
B-16	Graphite	40.0	16.0	10.000	60	520	515
B-17	Hard Clay	40.0	15.4	0.500	56	1340	630
B-18	Silica	40.0	20.2	0.022	70	3710	745
B-19	Titanium Dioxide	40.0	10.3	0.040	49	710	555
B-20	Moly-Sulfide**	40.0	8.3	22.000	60	1125	470
B-21	MT Black	20.0	11.1	0.350	55	940	535
B-22	EPC Black	20.0	11.1	0.029	60	2000	535
B-23	SCF Black	20.0	11.1	0.021	60	2595	600
B-24	GPF Black	20.0	11.1	0.051	59	1670	580
B-25	CF Black	20.0	11.1	0.023	62	2870	595
B-26	Graphite	20.0	8.0	10.000	60	580	525
B-27	Hard-Clay	20.0	7.7	0.500	58	955	605
B-28	Silica	20.0	10.1	0.022	64	1585	610
B-29	Titanium Dioxide	20.0	5.2	0.040	54	595	560
B-30	Moly-Sulfide**	20.0	4.2	22.000	57	825	535
B-31	MT Black	10.0	5.6	0.350	53	690	525
B-32	EPC Black	10.0	5.6	0.029	56	1180	515
B-33	SCF Black	10.0	5.6	0.021	57	1420	580
B-34	GPF Black	10.0	5.6	0.051	55	895	510
B-35	CF Black	10.0	5.6	0.023	57	1255	555
B-36	Graphite	10.0	4.0	10.000	56	520	500
B-37	Hard Clay	10.0	3.9	0.500	54	575	545
B-38	Silica	10.0	5.1	0.022	58	880	545
B-39	Titanium Dioxide	10.0	2.6	0.040	52	455	535
B-40	Moly-Sulfide**	10.0	2.1	22.000	54	650	585

* Approximate particle size in microns; ** Molybdenum Disulfide.

TABLE II—EFFECT OF GAMMA RADIATION ON THE PROPERTIES OF NITRILE ELASTOMERS

Materials	Dose (r x 10^{-6})	Initial Properties: Hardness Shore A;	Per Cent Change: Elongation Δ%	Tensile Δ%	Remarks
Hycar 1002					
B-11	0	55	590	1160	Black
	5	10.9	— 10.2	14.2	
	22	21.8	— 54.2	— 6.5	
	55	30.9	— 76.3	— 26.3	
	100	41.8	— 86.4	— 18.1	
	300	76.4	— 94.1	172.8	a
	500	87D*	—100.	469.8	a, b
B-12	0	65	550	3290	Black
	5	6.2	— 20.0	— 1.1	
	22	15.4	— 52.7	— 12.9	
	55	21.5	— 76.4	— 39.7	
	100	27.7	— 87.3	— 50.7	
	300	49.2	— 96.6	— 16.4	a
	500	87D*	—100.	>112.0	a, b, c
B-13	0	67	550	3840	Black
	5	3.0	— 5.5	10.2	
	22	11.9	— 42.7	— 10.4	
	55	20.9	— 70.9	— 51.4	
	100	26.9	— 81.8	— 37.0	
	300	83D*	— 98.2	24.2	a
	500	92D*	—100.	> 95.0	a, b, c
B-14	0	63	490	2260	Black
	5	11.1	— 13.3	6.6	
	22	19.0	— 49.0	5.1	
	55	22.2	— 71.4	— 9.1	
	100	34.9	— 83.7	— 7.7	
	300	58.7	— 95.9	100.0	a
	500	87D	—100.	830.7	a, b
B-15	0	69	490	3725	Black
	5	2.9	— 8.2	7.1	
	22	8.7	— 38.8	— 0.7	
	55	17.4	— 65.3	— 13.2	
	100	24.6	— 81.6	— 23.5	
	300	78D*	— 95.9	41.5	a
	500	93D*	—100.	> 85.0	a, b, c
B-16	0	60	515	520	Dark Grey
	5	10.0	— 6.8	13.5	
	22	18.3	— 47.6	15.4	
	55	23.3	— 76.7	21.2	
	100	33.3	— 88.3	39.4	
	300	65.0	— 95.1	359.6	a
	500	82D*	—100.	830.7	a, b
B-17	0	56	630	1340	Cream-Tan
	5	14.3	— 26.0	— 7.8	
	22	26.8	— 54.8	6.3	
	55	33.3	— 76.2	12.7	d
	100	42.9	— 84.1	13.4	e
	300	71.4	— 93.6	127.2	f, g
	500	84D*	—100.	> 489.0	a, b, c, f
B-18	0	70	745	3710	Cream-Tan
	5	10.0	— 28.9	— 10.6	
	22	17.1	— 61.7	— 38.5	
	55	21.4	— 83.2	— 47.4	h
	100	30.0	— 90.6	— 43.3	e
	300	41.4	— 98.7	20.7	a, f
	500	88D*	—100.	> 97.2	a, b, c, f
B-19	0	49	555	710	White
	5	14.3	— 9.9	— 9.2	
	22	26.5	— 44.1	— 20.4	
	55	34.7	— 68.5	— 31.7	i
	100	46.9	— 74.8	— 14.1	i
	300	93.9	— 91.0	219.7	g, i
	500	84.9	—100.	>818.3	a, b, c, j
B-20	0	60	470	1125	Dark Grey
	5	3.3	— 8.5	9.8	
	22	16.7	— 42.6	17.3	
	55	28.3	— 72.3	18.2	
	100	40.0	— 85.1	21.3	
	300	86D*	—100.	558.0	a, b
	500	88D*	—100.	>612.8	a, b, c
B-21	0	55	535	940	Black
	5	3.6	— 15.9	1.1	
	22	16.4	— 53.3	— 12.8	
	55	30.9	— 73.8	— 10.1	
	100	41.8	— 83.2	— 4.8	
	300	76D*	— 96.3	331.9	a
	500	85D*	—100.	>1257.0	a, b, c
B-22	0	60	535	2000	Black
	5	3.3	— 6.5	39.5	
	22	13.3	— 55.1	— 15.8	
	55	25.0	— 75.7	— 43.5	
	100	36.7	— 85.0	34.8	
	300	84D*	— 96.3	171.8	a
	500	87D*	—100.	>625.0	a, b, c
B-23	0	60	600	2595	Black
	5	3.3	— 13.3	14.5	
	22	13.3	— 48.3	— 5.2	
	55	26.7	— 75.0	— 40.3	
	100	36.7	— 86.7	— 48.0	
	300	80D*	— 95.0	88.4	a
	500	87D*	—100.	>385.0	a, b, c
B-24	0	59	580	1670	Black
	5	5.1	— 27.6	— 5.7	
	22	15.3	— 54.3	— 14.4	
	55	27.1	— 77.6	— 32.0	
	100	37.3	— 86.2	— 26.3	
	300	82D*	— 96.6	223.0	a
	500	88D*	—100.	>1233.0	a, b, c
B-25	0	62	595	2870	Black
	5	0.0	— 11.8	9.1	
	22	11.3	— 50.4	— 17.9	
	55	22.6	— 76.5	— 46.0	
	100	32.3	— 84.9	— 48.6	
	300	77D*	— 95.0	99.3	a
	500	88D*	—100.	>841.0	a, b, c
B-26	0	60	525	580	Dark Grey
	5	0.0	— 3.8	5.2	
	22	10.0	— 45.7	— 6.0	
	55	23.3	— 75.2	— 10.3	
	100	31.7	— 82.6	19.0	
	300	75D*	— 98.1	753.2	a
	500	83D*	—100.	>1317.0	a, b, c
B-27	0	58	605	955	Cream-Tan
	5	1.7	— 17.4	3.1	
	22	15.5	— 53.7	4.1	
	55	27.6	— 75.2	9.4	k
	100	39.7	— 85.1	27.7	
	300	83D*	— 96.7	551.8	a
	500	86D*	—100.	>797.0	a, b, c, l
B-28	0	64	610	1585	Cream-Tan
	5	3.1	— 14.8	22.1	
	22	12.5	— 55.7	— 23.3	
	55	25.0	— 78.7	— 29.0	k
	100	34.4	— 88.5	— 20.2	
	300	86D*	—100.	351.0	a, b
	500	88D*	—100.	>371.1	a, b, c, l

(Continued on next page)

TABLE II *(Cont'd.)*—EFFECT OF GAMMA RADIATION ON THE PROPERTIES OF NITRILE ELASTOMERS

Materials	Dose (r x 10⁻⁶)	Initial Properties and Per Cent Change — Hardness Shore A; Δ%	Elongation %; Δ%	Tensile psi; Δ%	Remarks
B-29	0	54	560	595	White
	5	3.7	— 14.3	— 2.5	
	22	16.7	— 50.9	— 13.4	
	55	29.6	— 73.2	— 11.8	k
	100	42.6	— 84.9	5.9	
	300	81D*	— 98.2	700.0	a
	500	86D*	—100.	>1300.0	a, b, c, m
B-30	0	57	535	825	Dark Grey
	5	1.8	— 26.2	— 10.3	
	22	15.8	— 49.5	7.9	
	55	28.1	— 73.8	15.2	
	100	42.1	— 85.0	43.0	
	300	85D*	— 98.1	863.0	a
	500	87D*	—100.	>918.0	a, b, c
B-31	0	53	525	690	Black
	5	3.8	— 20.0	— 21.0	
	22	17.0	— 50.5	— 12.3	
	55	30.2	— 71.4	— 8.7	
	100	45.3	— 81.0	15.9	
	300	78D*	— 98.1	552.2	a
	500	85D*	—100.	1446.0	a, b, c
B-32	0	56	515	1180	Black
	5	1.8	— 7.8	12.7	
	22	12.5	— 47.6	— 19.9	
	55	26.8	— 74.8	— 35.2	
	100	39.3	— 83.5	— 54.2	
	300	76D*	— 94.2	304.2	a
	500	85D*	—100.	1153.0	a, b
B-33	0	57	580	1420	Black
	5	3.5	— 17.2	10.2	
	22	14.0	— 55.2	— 27.5	
	55	26.3	— 74.1	— 25.7	
	100	36.8	— 82.8	— 29.2	
	300	76D*	— 94.8	224.6	a
	500	87D*	—100.	765.0	a, b
B-34	0	55	510	895	Black
	5	3.6	— 16.7	7.3	
	22	14.5	— 52.0	— 4.5	
	55	29.1	— 74.5	— 41.3	
	100	41.8	— 84.3	— 11.2	
	300	80D*	— 95.1	446.4	a
	500	86D*	—100.	1590.0	a, b
B-35	0	57	555	1255	Black
	5	4.8	— 4.5	33.9	
	22	10.5	— 45.9	— 5.6	
	55	24.6	— 71.2	— 19.9	
	100	36.8	— 83.8	— 34.7	
	300	79D*	— 95.5	306.8	a
	500	87D*	—100.	1025.0	a, b
B-36	0	56	500	520	Dark Grey
	5	1.8	— 31.0	1.0	
	22	10.7	— 47.0	— 4.8	
	55	25.0	— 78.0	— 11.5	
	100	35.7	— 84.0	17.3	
	300	76D*	— 96.0	737.4	a
	500	83D*	—100.	>1350.0	a, b, c
B-37	0	54	545	575	Cream-Tan
	5	3.7	— 13.8	0.9	
	22	16.7	— 45.0	18.3	
	55	31.5	— 74.3	28.7	k
	100	44.4	— 81.7	70.4	
	300	80D*	— 96.3	877.3	a
	500	84D*	—100.	>1267.0	a, b, c, l
B-38	0	58	545	880	Cream-Tan
	5	3.4	— 19.3	— 5.1	
	22	13.8	— 55.0	— 14.8	
	55	27.6	— 78.0	— 22.2	k
	100	37.9	— 85.3	— 3.4	
	300	86D*	—100.	603.4	a, b
	500	87D*	—100.	>760.0	a, b, c, l
B-39	0	52	535	455	White
	5	3.8	— 21.5	3.3	
	22	17.3	— 48.6	3.3	
	55	30.8	— 72.0	3.3	k
	100	46.2	— 81.3	56.0	
	300	81D*	— 97.2	1095.6	a
	500	86D*	—100.	>1524.0	a, b, c, m
B-40	0	54	585	650	Dark Grey
	5	1.9	— 25.6	1.5	
	22	14.8	— 54.7	3.8	
	55	31.5	— 79.5	— 4.6	
	100	44.4	— 84.6	49.2	
	300	81D*	— 97.4	976.0	a
	500	85D*	—100.	>1049.0	a, b, c

Notes: (a) = Broke when bent 180-degrees; (b) = Very stiff and brittle; (c) = Exceeded capacity of tensile tester; (d) = Light tan; (e) = Tan; (f) = Amber-tan; (g) = Barely broke; (h) = Yellow-tan; (i) = Cream; (j) = Darker cream; (k) = Darker cream-tan; (l) = Brown; (m) = Tan-cream; *Shore D hardness scale used.

on an equal basis because of the difference in properties of each of them such as reinforcing ability, surface area, compatibility, structure, composition, etc. However, a relative grading can be made on the basis of equal weight loadings as illustrated in Table III.

Here the materials are rated primarily on the basis of flexibility with some attention given to retention of original properties. The lowest number ratings indicate the fillers which have affected the nitrile polymer the least with respect to radiation damage. The tabulation shows the relative filler rating after an exposure of 3 x 10^8 r. This dose was chosen because at lower doses no great differences could be noted as all of the materials were in fairly good condition. At the highest dose studied, 5 x 10^8 r, all of the materials were severely damaged and therefore rating was impractical. It should be noted that because of the difficulty in comparing fillers on the basis of flexibility and retention of properties of the over-all nitrile compounds that the listings are purely relative and qualitative.

All fillers were studied in the Hycar 1002 nitrile elastomer to three loadings of ten, twenty, and forty parts by weight. This did not offer as great a filler range as was studied with the FEF black-loaded nitrile mentioned above, but nevertheless, certain observations were afforded.

The hardness of the materials behaved in an anomolous fashion similar to that of the tensile strength in that, at the higher doses, no definite trends could be

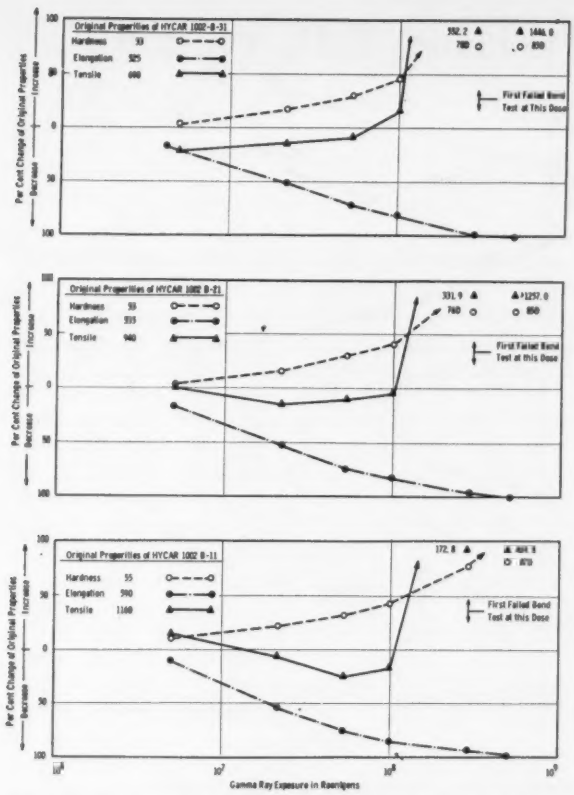

FIG. 1—Changes in properties of three MT carbon black-filled nitrile elastomers induced by exposure to gamma radiation in air at 25° C. and normal atmospheric pressure.

noted. In most cases with other elastomers, e.g., see *(2)* and *(6)*, in a filler loading series the hardness of the lowest loaded compound was increased at a greater rate than the next highest member and so on as the radiation exposure was increased. Thus, on a per cent change basis the lower members of the series would always have their hardness increased to the greatest extent. The higher loaded materials would always be actually harder than the lower loaded members of the series until the higher exposures, at which time the actual hardness of the materials would be either equal to or approaching the same value.

In the case of the nitriles, however, the hardness did not follow that pattern. For example, the MT black series reversed the above trend as, after an exposure of 3 x 10^8 r, the highest loaded compound was hardened the least while the lowest loaded material was hardened the greatest both on an actual value and per cent change basis. Indeed, in many instances the highest loaded material had its hardness affected less than the other materials in the series. In other instances (e.g., the SCF series) the hardness pattern followed that of the other elastomers as discussed above. The anomolous behavior of the hardness of the nitrile compounds might in part be attributed to the fact that some of the higher loaded materials had an original hardness value equal to or less than the lower loaded materials.

The elongation of the materials in the same filler series was affected in essentially the same manner on a per cent change basis. That is, the elongation appeared to be independent of the filler type with respect to per cent decreases at any given radiation dose. With respect to flexibility there does not appear to be any optimum loading over the range studied.

From the somewhat erratic behavior of the hardness and tensile strength of the nitrile materials it appears quite logical to assume that radiation-induced reactions between the fillers and the other components of the compounds are taking place which are a function both of amount of filler and total radiation dose. In addition, it could also be assumed that the fillers would be inhibiting reactions which might otherwise occur. In some, but not all, cases the higher loaded materials appear to be protected somewhat from radiation damage by the greater amount of filler. In other instances lower loaded materials are less affected from exposure to the ionizing radiation. However, because a minimum number of compounds were studied with respect to filler loading range and the diversity of the filler types, no attempt at present is being made to speculate as to the mechanisms of reaction between the fillers and the nitrile compounds.

TABLE III—FILLER RATINGS IN A NITRILE ELASTOMER AFTER BEING EXPOSED TO GAMMA RADIATION TO A DOSE OF 3 x 10^8 r

Filler Type	Filler Amount		
	10 Parts	20 Parts	40 Parts
MT Black	1	1	4
EPC Black	3	3	6
SCF Black	1	1	2
GPF Black	2	3	6
CF Black	2	2	1
Graphite	3	3	5
Hard Clay	4	4	3
Silica	5	5	7
Titanium Dioxide	4	4	2
Molybdenum Disulfide	4	5	5

Summary

The work reported here has shown in general how various filler materials affect the radiation resistance of a typical nitrile elastomer, Hycar 1002. The nitrile compounds selected for study were designed with minimum compounding ingredients in order that radiation induced changes would best reflect types and amounts of fillers with minimum masking from possible effects created by other materials.

Therefore, they were not necessarily practical compounds with respect to mechanical and environmental characteristics, and also were not as radiation-resistant as other nitriles which have been investigated. This is illustrated in Figure 2 which compares the radiation-induced property changes with the forty part EPC carbon black nitrile (Hycar 1002 B-12) with another nitrile compound.* On the basis of increases in hardness, retention of properties, and flexibility, the latter material is approximately ten times as radiation resistant as the B-12 material.

* Compound developed at Hanford Laboratories Operation. R. Harrington, unpublished data.

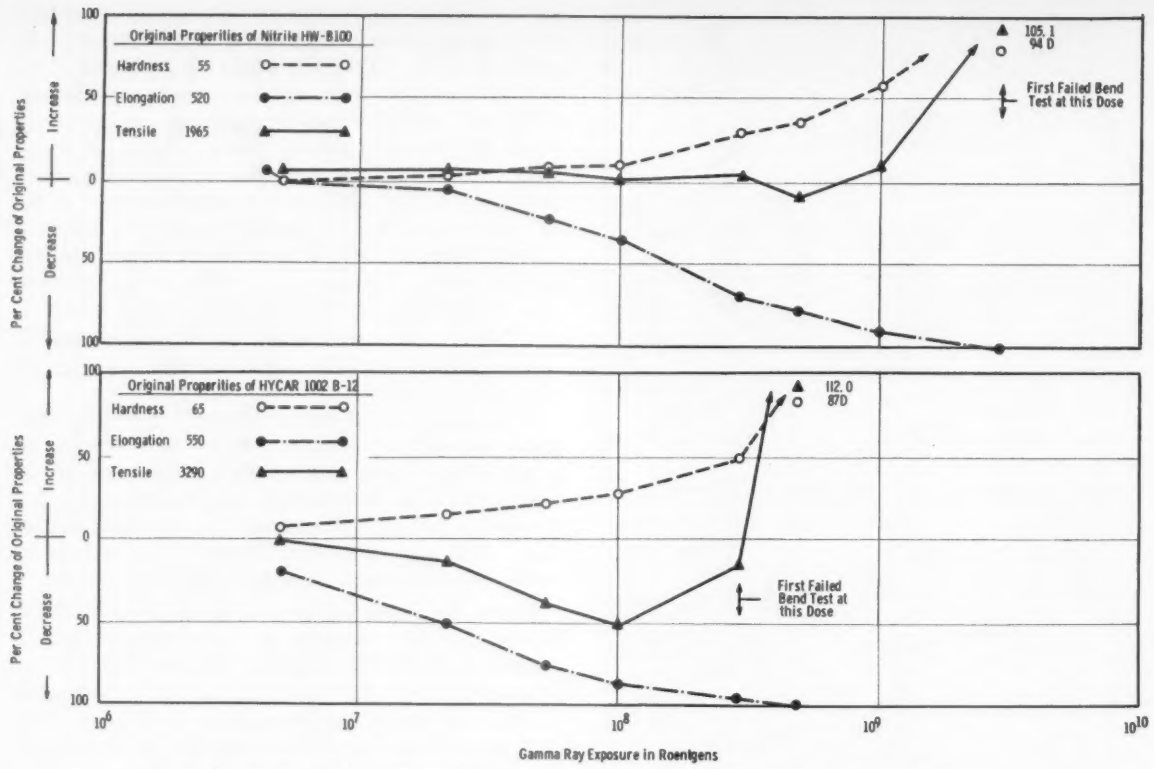

FIG. 2—Comparison of the gamma radiation induced changes in two different types of nitrile elastomers.

It has been shown that both hardness and tensile strength are affected in varying degrees with respect to compounds within a filler series and compounds of different series compared on an equal loading basis. The elongation, on the other hand, was essentially the same based upon per cent change. The observations noted with the nitrile materials are considerably different than those noted with other classes of elastomers, where the tensile strength and particularly hardness often follow a definite pattern with respect to property changes within a filler series and in many instances between equally loaded materials with different fillers. The only consistent behavior noted among the various nitrile compounds was the extreme rise in tensile strength after exposures of 3 x 10^8 r with accompanying loss of elongation and severe embrittlement. It should be noted here that the data presented for the medium high acrylonitrile content Hycar 1002 elastomer could probably be considered representative of the behavior of other types of nitrile elastomers.

Particle size of the fillers apparently has no effect on the radiation induced changes to the nitrile materials. It is difficult to select the filler which was superior because of the many factors involved and the fact that a limited number of compounds within a series were studied. In general, if a selection is necessary, the carbon blacks and graphite appear to be best up to doses in the order of 1 x 10^8 r. At 3 x 10^8 r, the CF and SCF are the best blacks and the titanium dioxide is the best of the non-blacks. No rating of the fillers was made after an exposure of 5 x 10^8 r because of the severe damage all sustained.

It is interesting to note that with respect to radiation damage there is little correlation between individual filler effects on the nitrile elastomers as compared with other diene type rubbers such as neoprene and styrene-butadiene as discussed earlier in this series.

Acknowledgement

Acknowledgement is made to J. F. Whiting, G. A. Daum, and C. E. Fleming of the B. F. Goodrich Chemical Company for their cooperation in submitting test samples and pertinent materials information. It should be noted that the manufacturer of the materials evaluated might never have developed or intended them for the conditions to which they have been subjected. Any failure or poor performance of a material is not necessarily indicative of the utility of the material under less stringent conditions or for other applications. Acknowledgement is also made to J. A. Ulseth and F. M. Newby, Hanford Atomic Products Operation, General Electric Company, for their assistance in carrying out the irradiations. The work reported here was performed under Contract No. AT (45-1)-1350 for the U. S. Atomic Energy Commission.

Literature References

(1) Harrington, R., *Rubber Age*, Vol. 81, p. 971 (1957).
(2) Harrington, R., *Rubber Age*, Vol. 82, p. 461 (1957).
(3) Harrington, R., *Rubber Age*, Vol. 82, p. 1003 (1958).
(4) Harrington, R., *Rubber Age*, Vol. 83, p. 472 (1958).
(5) Harrington, R., *Rubber Age*, Vol. 85, p. 963 (1959).
(6) Harrington, R., *Rubber Age*, Vol. 86, p. 819 (1960).
(7) Harrington, R., *Rubber Age*, Vol. 88, p. 475 (1960).

Laboratory Mill Safety Can Be Obtained

By GEORGE GOODMAN
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Philadelphia, Penna.

How a newly designed mill guard eliminates the possibility of "wringer" type mishaps

A LABORATORY mill can often be a dangerous piece of equipment, and too often cases turn up in plant accident reports *(1)* that read like the following:

> It was nearing 5 o'clock and John Bryant, the laboratory attendant, was finishing his work at the lab mixing mill. As he started to wipe moisture from the mill, the cleaning cloth caught between the rolls, pulling his hand in along with it. The worker lost two fingers.

Fatigue, carelessness, or a twist of fate can lead to disasterous results, and the possibility of accident is always present *(2)*. But now a new, foolproof safety device is available.

Most mills are presently equipped with either an on-top safety bar or the knee-type safety. A slight touch on either stops the motor and applies a brake. But a conscious, positive action is required to actuate the mechanism as danger is sensed. If the operator panics, loses consciousness, or leaps back without touching either safety, not only fingers, but a hand or arm can be lost.

The Rubber and Plastics Research Association of Great Britain has long been concerned with the safe operation of lab mills. In a report in RUBBER AGE in June, 1960, this organization suggested many improvements. One of these, now called the Shawbury Guard, has been manufactured in this country and is presently being used. The reports from one modern, efficient laboratory are very encouraging *(3)*.

With the Shawbury Guard in place, it is impossible to get finger tips into the danger zone without tripping the safeties. No definite action is required. If the operator falls unconscious while working on the running machine, or should even try to purposely get caught, it is impossible for him to be pulled into the turning rollers. Yet all normal operations can be performed with only minor changes in technique.

Some doubt was first expressed over these technique changes. Since the operator is forced to keep away from the danger zone of the mill, he must perform his work on the safe, lower half of the rolls. This proved to be only a minor inconvenience. It was noticed also that throughout the tests of the Guard greater ease of operation actually resulted when the distance from the floor to the roll center line was increased to 45 inches. This increased height greatly helps the operator by raising the safe work area to a more convenient position.

The "bird cage" device on the top of the Guard, while allowing the raw rubber or rolled up stock to be dropped through, does not allow an elbow joint to be bent into it. The material falls precisely in place, and the operator is spared the hazard of handling material right at the danger zone. Powder, fillers, and oils can be added to the batch through slots in the Guard.

FIG. 1—An installation of the Shawbury Guard on a 6 by 12 inch laboratory mixing mill. The safety system follows the recommendations of the British Rubber and Plastics Research Association.

The first installation of the Shawbury Guard in this country prompted the following remarks by the research director in charge:

"The inconvenience is very slight. Sometimes I try to reach past a protected section, but then realize that the Guard is really saving me from possible trouble. My mind is at ease regarding safety, not only when I operate the mill, but when my men are operating it as well."

At a time when occupational hazards are being reduced day by day, the Shawbury Guard comes as another step forward for the rubber and plastics industries. Trained and experienced lab mill operators are valuable and hard to replace. The Guard and the encouraging reports concerning it should lead to new and better working conditions for these men in every laboratory.

LITERATURE REFERENCES

(1) *Rubber Age*, Vol. 78, No. 5 (1956).
(2) *Rubber Age*, Vol. 77, No. 3 (1955).
(3) For more information concerning the development of this guard, see: *Rubber Age*, Vol. 68, No. 6 (1951); and *Rubber J.*, March (1957).

Acrylonitrile Blends vs. Single Copolymers in NBR Compounding

The fuel and oil resistance of butadiene-acrylonitrile rubber appears to be a function not only of acrylonitrile percentage but also of the manner in which it is combined with butadiene

By CARL E. FLEMING
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IT has been reported that the oil and fuel resistance of a nitrile rubber is a direct function of the amount of acrylonitrile present regardless of how the acrylonitrile is combined. With the commercial introduction of a very high acrylonitrile polymer, it was possible to check this theory with polymers covering a broader range of acrylonitrile contents than reported on previously. A variety of copolymers in the range of 20 to 48 per cent acrylonitrile were blended in pairs to produce an elastomer blend of 30 per cent acrylonitrile. Data for these blends were then compared with predicted results for a copolymerized material of identical acrylonitrile content. An interesting relationship between blends and single copolymers was observed.

Experimental

Acrylonitrile contents of the nitrile polymers were determined by nitrogen analysis after which blends were prepared to give an elastomer composition containing 30 per cent acrylonitrile. Blending was carried out on a 6 by 16 inch mill by breaking down both polymers involved in the blend and adding strips of the lower acrylonitrile material to the rolling bank of the higher acrylonitrile polymer.

Single copolymers and copolymer blends were compounded in two typical test formulas, one plasticized and the other unplasticized. These formulas together with the data obtained for corresponding vulcanizates are presented in Tables I and II.

Data were determined using the following ASTM standard methods:

Stress-Strain	ASTM D-412 (Die C)
Hardness	ASTM D-676
Compression Set	ASTM D-395 (Method B)
Low Temperature Brittleness	ASTM D-746
Low Temperature Stiffness	ASTM D-1053
Immersions	ASTM D-471

Results

In general, all polymer blends showed a balance of volume swell-low temperature brittleness which was poorer than that of standard nitrile polymers. This is shown graphically for the two formulas in Figures 1 and 2 where it can be seen that in every case the points representing blends of copolymers lie above the curve connecting points corresponding to single copolymers.

Also evident from these curves is the fact that while all blends were prepared at 30 per cent acrylonitrile, their positions on the plot are quite different from each other and also from what would be expected of a 30 per cent acrylonitrile polymer. The blends of S-T and S-U show approximately the volume swell which would be predicted for a 30 per cent acrylonitrile material but the low temperature brittleness is poorer. This phenomenon was mentioned in an article *(1)*

Note: This paper was presented before the 79th meeting of the Division of Rubber Chemistry, American Chemical Society, April 19-21, 1961, in Louisville, Ky.

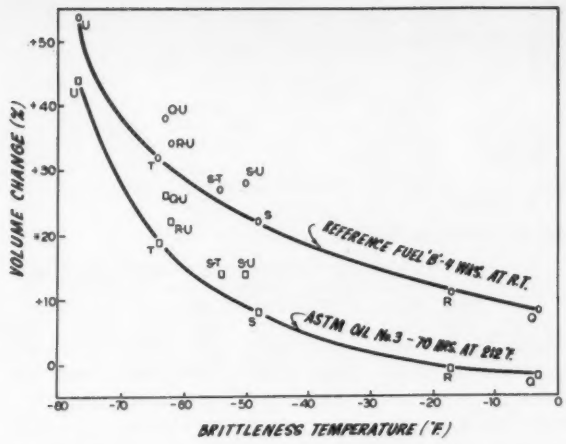

FIG. 1—Volume change vs. ASTM D-746 brittleness temperature of base formula No. 1.

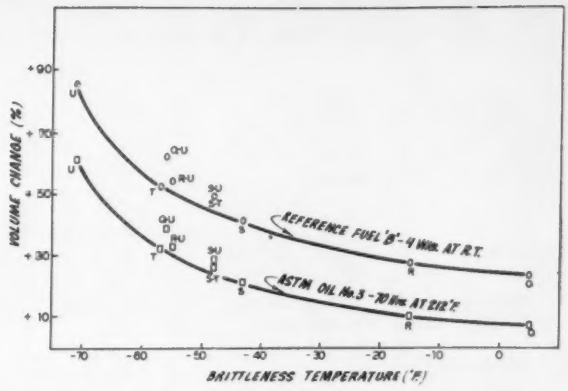

FIG. 2—Volume change vs. ASTM D-746 brittleness temperature of base formula No. 2.

discussing nitrile rubbers in general in which it was stated that blends of copolymers have similar swelling in fuel but inferior low temperature flexibility than a copolymer of equivalent acrylonitrile content. This appears to be true for blends of copolymers with acrylonitrile contents which are not greatly different from one another, as for example the S-T or S-U blends. If, however, the original copolymers have widely different acrylonitrile contents, a blend of these will provide a volume swell which is significantly larger and a brittleness temperature which is better than a single copolymer of equivalent acrylonitrile content.

Plots of Volume Swell

As a follow-up to this observation, plots of volume swell in fuel or oil versus acrylonitrile contents were prepared for standard nitrile copolymers, and the points representing the various blends were inserted on the 30 per cent acrylonitrile line. These plots are shown in Figures 3 through 6. Duke and Mitchell *(2)* state that "the correlation between oil resistance and acrylonitrile content holds true regardless of whether the acrylonitrile content is arrived at by direct copolymerization, or by mill-mixing blends of copolymers of different acrylonitrile contents." These authors present data on copolymers only as high as 2/1 butadiene/acrylonitrile ratio (or approximately the composition of Polymer S). A look at Figures 3 through 6 shows that the plot is essentially a straight line from Polymer U to Polymer S so that their conclusion is correct up to that point. As the acrylonitrile content is increased to Polymers R and Q, however, it is seen that there is a definite curve to the plot, and it is because of this non-linear behavior that the difference between copolymer blends and single copolymers is obtained.

It is seen that the volume swell of a copolymer blend falls on a straight line drawn between the two copolymers rather than on the standard volume swell-acrylonitrile curve. In other words, blends of copoly-

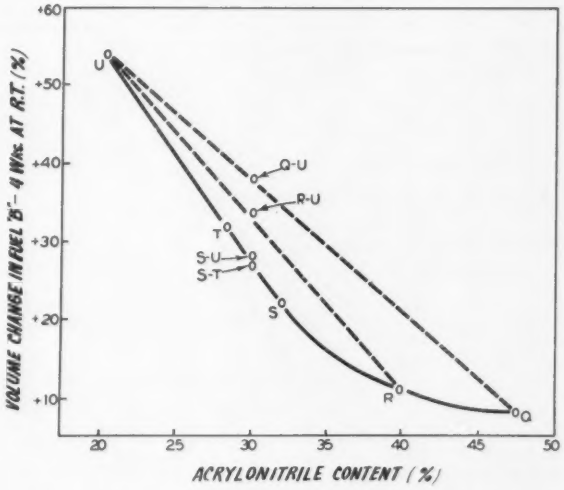

FIG. 3—Volume change in Fuel B vs. acrylonitrile content: base formula No. 1.

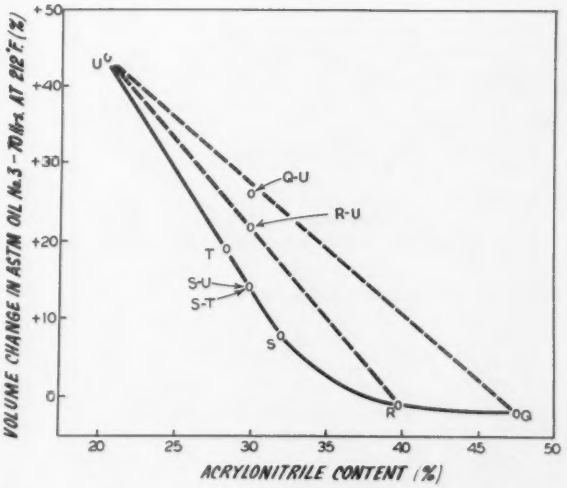

FIG. 4—Volume change in ASTM Oil No. 3 vs. acrylonitrile content: base formula No. 1.

Table I—Comparison of Plasticized Copolymers and Blends

	1	2	3	4	5	6	7	8	9
Polymer Q (47.5% acrylo.)	100	...	...	...	...	35.7	...	...	...
Polymer R (39.8% acrylo.)	...	100	...	...	...	...	49.7	...	...
Polymer S (32.0% acrylo.)	...	...	100	...	...	...	...	82.9	45.9
Polymer T (28.3% acrylo.)	...	...	...	100	...	...	...	...	54.1
Polymer U (20.3% acrylo.)	...	...	...	...	100	64.3	50.3	17.1	...

Original Properties—All cures 30 minutes at 310° F.

	Q	R	S	T	U	Q-U	R-U	S-U	S-T
Modulus at 300% elongation (psi)	....	2070	2010	1750	1670	2240	1990	1930	1860
Ultimate tensile strength (psi)	2470	2720	2560	2470	2280	2240	2400	2500	2470
Ultimate elongation (%)	220	460	430	470	410	300	380	410	430
Hardness (Duro A)	79	71	68	66	63	69	67	67	67
Block cured 45 minutes at 310° F.									
Compression set—ASTM Method B									
70 hrs. at 212° F. (%)	33	34	29	32	32	30	34	29	31
Hardness (Duro A)	80	68	66	65	61	67	65	65	65
Samples cured 30 minutes at 310° F.									
Low temperature brittleness—ASTM D-746									
T_b (° F.)	—3	—17	—48	—64	—77	—63	—62	—50	—54
Gehman low temperature torsion test									
T_2 (° C.)	+1	—10	—17	—20	—24	—5	—13	—19	—18
T_5 (° C.)	—6	—16	—21	—25	—34	—14	—17	—23	—23
T_{10} (° C.)	—9	—17	—24	—26	—36	—21	—20	—25	—26
T_{100} (° C.)	—14	—22	—30	—32	—43	—38	—26	—31	—31
Freeze point (° C.)	—13	—21	—30	—31	—43	—39	—26	—31	—31
ASTM Oil No. 3—Volume change (%)									
70 hrs. at 212° F.	—2	—1	+8	+19	+44	+26	+22	+14	+14
Fuel B—Volume change (%)									
4 weeks at R. T.	+8	+11	+22	+32	+54	+38	+34	+28	+27

Table II—Comparison of Unplasticized Copolymers and Blends

	10	11	12	13	14	15	16	17	18
Polymer Q (47.5% acrylo.)	100	...	...	...	...	35.7	...	...	...
Polymer R (39.8% acrylo.)	...	100	...	...	...	...	49.7	...	...
Polymer S (32.0% acrylo.)	...	...	100	...	...	...	...	82.9	45.9
Polymer T (28.3% acrylo.)	...	...	...	100	...	...	...	...	54.1
Polymer U (20.3% acrylo.)	...	...	...	...	100	64.3	50.3	17.1	...

Original Properties—All cures 30 minutes at 310° F.

	Q	R	S	T	U	Q-U	R-U	S-U	S-T
Modulus at 300% elongation (psi)	2150	1440	1420	1390	1480	2050	1870	1370	1370
Ultimate tensile strength (psi)	2180	3090	2830	2830	2480	2350	2650	2760	2800
Ultimate elongation (%)	310	640	550	550	450	340	440	550	550
Hardness (Duro A)	83	72	70	67	66	72	69	68	68
Block cured 45 minutes at 310° F.									
Compression set—ASTM Method B									
70 hrs. at 212° F. (%)	30	26	29	26	21	22	24	26	27
Hardness (Duro A)	83	70	69	67	65	70	69	68	68
Samples cured 30 minutes at 310° F.									
Low temperature brittleness—ASTM D-746									
T_b (° F.)	+5	—15	—43	—57	—71	—56	—55	—48	—48
Gehman low temperature torsion test									
T_2 (° C.)	+10	—5	—10	—14	—22	—4	—8	—15	—17
T_5 (° C.)	—1	—11	—18	—21	—35	—10	—15	—20	—21
T_{10} (° C.)	—4	—13	—21	—23	—37	—14	—17	—22	—22
T_{100} (° C.)	—10	—17	—27	—30	—42	—39	—22	—28	—28
Freeze point (° C.)	—8	—17	—27	—28	—41	—21	—21	—28	—29
ASTM Oil No. 3—Volume change (%)									
70 hrs. at 212° F.	+7	+10	+21	+32	+61	+39	+33	+28	+27
Fuel B—Volume change (%)									
4 weeks at R. T.	+23	+27	+41	+52	+85	+62	+54	+49	+49

Base Formula No. 1—See Table I

Polymer or polymer blend	100.0
Zinc oxide	5.0
Sulfur[1]	1.5
Stearic acid	1.0
SRF Black[2]	65.0
Dioctyl phthalate[3]	15.0
Tetramethyl thiuram monosulfide[4]	0.4
	187.9

(1) Blackbird; (2) Sterling S; (3) Good-rite GP-261; (4) Unads.

mers show a balance between volume swell and acrylonitrile content as a linear relationship between the two copolymers involved. This is more obvious for those blends of copolymers containing much different acrylonitrile contents than for those of neighboring copolymers.

Actually, the S-T and S-U blends appear to fall on the standard copolymer curve since the curve between adjacent or near adjacent points approaches a straight line. This means, then, that in the range of 20-47.5 per cent acrylonitrile, blends of copolymers will have a volume swell in oil and fuel which is equal to or greater than that of a single copolymer of equivalent acrylonitrile content, the deviation being dependent on the proximity of the acrylonitrile contents of the copolymers involved. Corresponding low temperature brittleness may be better or poorer than that of a single copolymer.

Low Temperature Data

One thing which might be significant in the low temperature data obtained on the Q-U and R-U blends is their poor showing on the Gehman Torsional Test in spite of their good brittleness temperature. One author *(3)* in describing the effect of temperature on resilience of natural rubber and nitrile rubber alone and in blends states that each elastomer has a temperature of minimum resilience while with a blend two minima are obtained. Relating this to the R-U and Q-U blends, it is possible that the high acrylonitrile portion becomes stiff and leathery causing poor Gehman results but having little effect on the low temperature impact resistance which is being influenced mostly by the Polymer U portion.

As a final test of the linear relationship observed with blends of copolymers, a blend was prepared using all five copolymers. Table III gives the formula used and the data obtained while Figure 7 shows that, once

Base Formula No. 2—See Table II

Polymer or polymer blend	100.0
Zinc oxide	5.0
Stearic acid	1.0
FEF Black[1]	40.0
Tetramethyl thiuram disulfide[2]	3.5
	149.5

(1) Arovel; (2) Methyl Tuads.

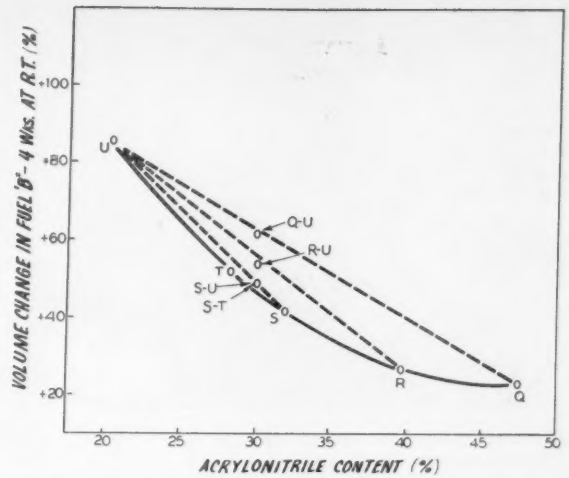

FIG. 5—Volume change in Fuel B vs. acrylonitrile content: base formula No. 2.

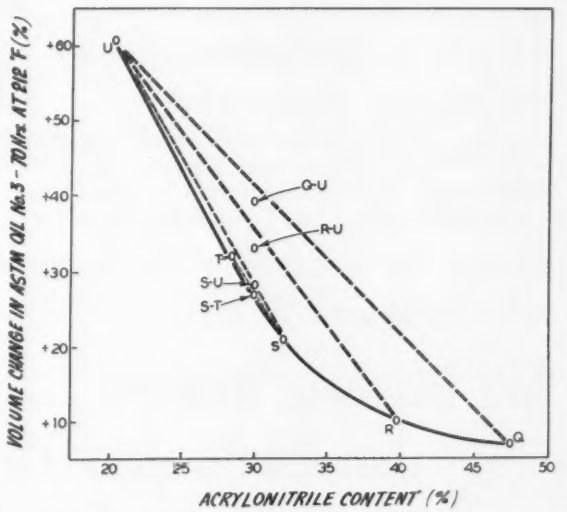

FIG. 6—Volume change in ASTM Oil No. 3 vs. acrylonitrile content: base formula No. 2.

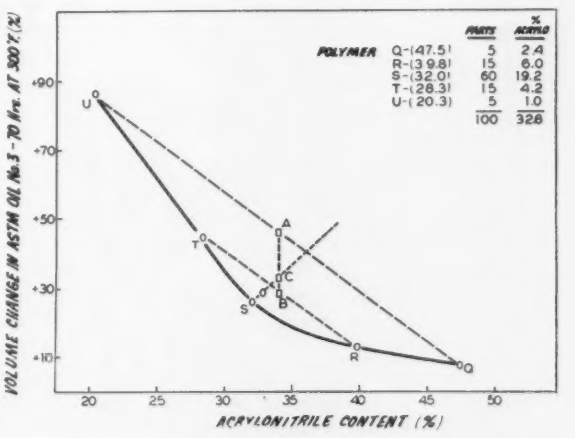

FIG. 7—Volume change in ASTM Oil No. 3 vs. acrylonitrile content: five polymers blended in base formula No. 2.

TABLE III—RESULTS OF BLEND USING FIVE COPOLYMERS

Polymer Q (47.5% acrylo.)	5
Polymer R (39.8% acrylo.)	15
Polymer S (32.0% acrylo.)	60
Polymer T (28.3% acrylo.)	15
Polymer U (20.3% acrylo.)	5
Zinc oxide	5
Stearic acid	1
FEF Black[1]	40
Tetramethyl thiuram disulfide[2]	3.5
	149.5

(1) Philblack A (2) Methyl Tuads

Original Properties—All cures 30 minutes at 310° F.

Modulus at 300% elongation (psi)	1370
Ultimate tensile strength (psi)	3100
Ultimate elongation (%)	610
Hardness (Duro A)	69
Low temperature brittleness ASTM D-746 T_b (° F.)	—51
ASTM Oil No. 3—Volume change (%) 70 hrs. at 300° F.	+28

again, the volume swell can be predicted by graphical analysis. By connecting points representing the various polymers and resulting blends with straight lines, it is seen that the final blend, which in this case was 32.8 per cent acrylonitrile, exhibits a volume swell exactly equal to that indicated by the intersection of the last constructed line (C-S) and the projected 32.8 per cent acrylonitrile line.

Summary

The balance between volume swell and low temperature brittleness varies not only with acrylonitrile level but also with the way in which the acrylonitrile is combined. Various combinations blended to a 30 per cent acrylonitrile content exhibit properties quite different from each other and also from what would be expected of a 70/30 butadiene/acrylonitrile copolymer. A blend of five polymers of different acrylonitrile contents also gives results unlike those of a single copolymer of the same acrylonitrile content. It appears that volume swell in oil and fuel is a linear function of the mill-mixed polymers, and the greater the difference in acrylonitrile contents of any two polymers involved, the more the volume swell will differ from that of a copolymerized material of identical acrylonitrile content.

LITERATURE REFERENCES

(1) Buckler, E. J., and Harris, I. W. E., *Trans. Inst. Rubber Ind.*, Vol. 31, Feb. (1955).
(2) Duke, N. G., and Mitchell, W. A., *Rubber World*, July (1953).
(3) Mullings, L., *Trans. Inst. Rubber Ind.*, Vol. 22, Feb. (1947).

SCRAP HANDLING • • •

Self-Dumping Hoppers for Waste Removal

SCRAP handling time has been reduced by 70 per cent at the Niagara Falls Division plant of the Electric Autolite Company, by replacement of non-dumping tote boxes with self-dumping hoppers.

The Niagara Falls, N. Y. plant produces molded rubber products, among them automotive battery cases, covers, and separators. In the molding of these products, rubber flash, trimmings and other scrap accumulated at a rate that required a fork truck and two men working three man-hours a day to dispose of it.

In an attempt to reduce the time and cost involved in this maintenance, the firm's management switched to self-dumping hoppers of 1½ cubic yard capacity manufactured by Roura Iron Works, Inc., of Detroit. Eight of these hoppers are placed in the molding departments and with their use, scrap is now disposed of in less than one-man hour per day. Savings in handling costs are expected to pay for the hoppers within a year.

By using the hoppers, only a fork truck operator is required when dumping them in large scrap containers outside the plant. A fork truck lifts the hopper above the outdoor scrap container, and the operator trips a lever on the rear of the hopper. The hopper rocks forward, empties its load and automatically returns to its original upright position and locks in place.

The empty hopper is then lowered and returned to the scrap collection point within the plant. Before purchase of the hoppers, a utility man was required to pull the scrap from the tote boxes with a drag rake.

FIG. 1—Scrap from multi-cavity molding machines producing battery container cell covers is placed in self-dumping hopper spotted near molding line in cover mold department.

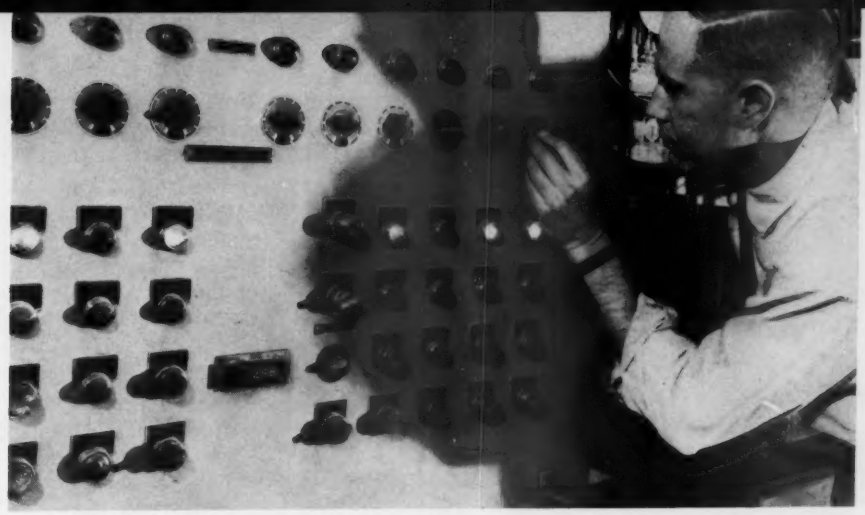

FIG. 1 — Production superintendent at control panel for automatic weighing of materials for masterbatch. Capsule No. 248 at lower center is "brain" activating mixing system.

An Automatically Controlled Banbury Mixing System

A sequential description of the automated compounding line recently completed by Lee Rubber & Tire Company

THE Banbury mixing system now in operation at the Lee Rubber & Tire plant in Conshohocken, Penna., is a good example of what can be achieved when the laboratory, the machine builder, and the production man pool their various talents. Conceived in the spring of 1957, the high speed mixing sequence was first tested at the Ansonia, Conn., Process Laboratory of Farrel-Birmingham by the manager of the Lee research and development department.

With data on physical specifications, cycles, power requirements, and tonnage thus obtained, Lee Rubber and Tire then brought the Farrel Process Engineering Division into the picture. Gradually the overall layout of automated equipment began to take form. In March, 1959, final approval of the project was granted, and by December of that year the installation was completed. Outwardly it appears deceptively simple.

On start-up, a small controlling cartridge is inserted into its aperture on the control board beside the Banbury mixer on the No. 5 compounding line. The start button is pushed. Two and a half minutes later 425 to 500 pounds of masterbatch are ready to be pelletized.

The automated compounding line that brings this to pass is a synchronized system of hardware and electronics. Brains of the Lee Banbury mixing system are the Richardson formula capsules (No. 248 is shown in Figure 1). Each of the tiny boxes contains a number of resistors, each of which is set to control the desired quantities of the oils and blacks which are to be fed into the Banbury. About fifteen capsules have been assembled for the compounding of passenger, truck and camel-back stocks. All formulas are prepared and locked in by the laboratory, and human errors in formulation and weighment are thus reduced to a minimum.

The nerve center of the system is a Taylor-Ohio Robotron Controller which automatically controls the raising and lowering of the Banbury ram, regulates the admission of raw ingredients on a time and se-

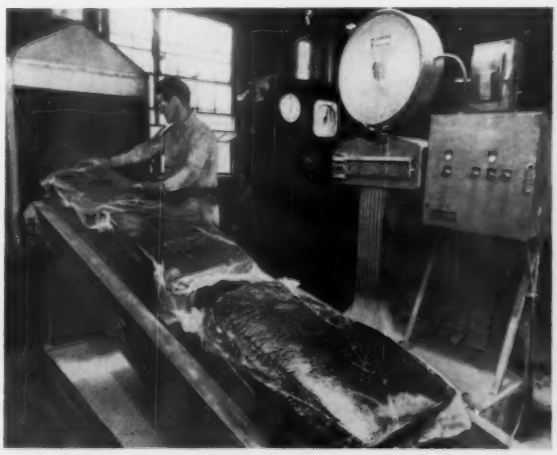

FIG. 2—Wrapped rubber is placed on conveyor, weight noted; other small-volume, pre-weighed additives also enter here.

FIG. 3—Materials in bins above collection boxes are automatically measured according to instructions from capsule No. 248. Operator pushes a button to release that amount.

quence basis, dumps the batch and resets for the next batch. This sequencing can be adjusted for different cycles by a simple slide switch change. Once the formula capsule has been inserted and the Robotron activated, the entire mixing cycle becomes automatic and repetitive.

Mechanical Components

First to go into operation is the Richardson weighing and feeding equipment for carbon black and oils. Acting on the pre-selected settings of the resistors, up to 250 pounds each of four different blacks can be brought from central storage on the roof of the plant, screw-fed into accumulative weigh scales, and then discharged into the Banbury by Syntron vibrators. An over/under tolerance control, built into the Richardson panel, stops the system and actuates an alarm light if the weight is not within a prescribed tolerance.

Simultaneously, a Richardson oil scale system is metering and pumping the desired combination and quantity of up to three of six different process oils through an injection nozzle in the side of the Banbury mixing chamber. A pumping capacity of eight gallons of 350 SSU oil in ten seconds at 150 psi pressure, plus introduction of the oil into the heart of the batch, materially reduces the mixing cycle. In addition, an individual and accumulative tolerance control insures the accuracy of the oil weighments.

Meanwhile, the Banbury operator has been loading cut rubber on the conveyor scale in front of the mixer (see Figure 2), and the Robotron automatically discharges the conveyor load at the precise moment when the Banbury feed door opens and the ram is raised. However, if the amount of rubber is not within pre-set limits, the conveyor will not move and the sequencing remains static until a correction has been made. At the same time, small volume components such as stearic acid, stabilizers and antioxidants have been weighed out by the Glengarry additive weighing system pictured in Figure 3 and are awaiting collection by the operator who places them with the cut rubber. As each weighment is released, on pushbutton control by the operator, a repetitive one automatically moves in behind it.

The "muscle" of the system is a high pressure, size 11D Uni-drive Banbury mixer coupled to a 1250 hp motor. The resulting rotor speed of 60 rpm is the highest ever attained on tire stocks with a machine of this size. Feeding of bulk material through the rear of the hopper, and drop-door operation on a seven-second cycle, provide the quick loading and discharge essential for short mixing cycles.

Dropping down from the Banbury, the stock discharges directly into the hopper of a 15-inch pelletizer, where an air-operated pusher forces it into the screw, thereby eliminating the possibility of hang-up in the hopper or a starved-screw condition. Driven by a 200 hp motor through a Dynamatic coupling, the pelletizer has ample reserves of power and speed to keep well ahead of even the shortest mixing cycles.

Normally, the screw speed is set so that the next Banbury batch is discharged just as the last of the previous one is fed into the screw. This synchronization ensures a steady flow of material to and from the pellet head, and uniform pellet size with a minimum of fines (see Figure 4). A cushion is provided by the hopper which will accommodate up to two and one-half Banbury batches without difficulty.

The stock, as it issues from the die, is in the form of cylindrical pellets roughly 5/8 inches in diameter and 1 inch long. This length may be varied as desired by adjusting the rpm of either the screw or the cut-off knives, both of which have variable speed control. The stock has a temperature at this point of approximately 10 degrees F. below the Banbury discharge reading, and it is immediately deluged, at the die plate itself, with a slurry containing anti-stick agents.

At this point, the pellets drop down onto a stainless steel Ajax vibrating conveyor with slot-screen construction. After a travel of 15 feet, the rubber (with excess slurry removed, and a substantial initial reduction in temperature through evaporation) is vibrated onto a May-Fran cleated steel belt conveyor which elevates the stock to the top of a three-pass Sargent cooler. Entering the Sargent cooler, the pellets pass successively over three perforated conveyor belts through which high-velocity air is circulated. At discharge from the cooler, after a passage time of fifteen minutes, the pellets are completely dry, close to ambient temperature, and have a uniform residual coating from the slurry. Here again, as with the dewatering and elevating conveyors, the rate of travel may be adjusted to meet varying conditions of temperature, humidity and production rates, so that all components are operating at compatible speeds.

Next step in the sequence is the elevation of the pellets straight up through the second floor to the top of the penthouse located on the roof of the building. This is accomplished through the use of a second May-Fran cleated belt conveyor approximately 65 feet in length. Coming off this conveyor, the stock drops into a metering hopper equipped with an air-operated clamshell-type bottom gate. When a pre-set level in the hopper is reached, a Bindicator

FIG. 4—Pelletizer shown with head in open position.

actuates the discharge gate, releasing a volume of pellets calculated to fill one 3-foot pocket of the May-Fran storage conveyor. The latter item, with a total capacity of 18,000 pounds of rubber, is designed to hold the pelletized masterbatch until final mixing.

As each bucket or section of its two 36-foot lengths is filled, the conveyor indexes to bring the next pocket into position. The condition of each bucket, either full or empty, as well as the flow status of all other components of the conveying system, is constantly indicated on the Sensory graphic control panel shown in Figure 5. This is located adjacent to the masterbatch Banbury, within convenient view of the operator or the compounding room foreman.

Moving on to the final stage in the compounding process, the pellets are taken as required from the storage section by a May-Fran feeder conveyor and delivered to a Richardson automatic weigh scale, with dribble control for accurate weighments within one-pound increments. When the scale setting is reached the pellets are discharged by chute into the hopper back door of the finish-mix Banbury.

If, on the other hand, production requirements are such that this mixer is to be by-passed, an air-operated diverter discharges the pellets into tote pans for processing at a later date in this or other Banburys. Simultaneously with the weighments of rubber into the Banbury, the operator adds automatically preweighed sulfurs and accelerators from a five-station Glengarry system similar to the one used for additive weighing for the masterbatch.

From a mechanical standpoint it might be expected that a system of such complexity, incorporating so many innovations, might have more than its share of "bugs." However, Lee production personnel report that down-time and revisions have been at a minimum, and performance has been very high.

Conclusions

Having seen what this automated system will accomplish, a question undoubtedly will arise concerning its value in terms of operating costs, return on investment and quality control. On the improvement of quality, Lee's laboratory personnel stated:

"Since we installed this new Banbury mixing system, we've kept charts based on a data list from 4,500 batches. Out of that number, only eighteen batches have been 'out of spec'; or off from the control limits set for a given batch. That amounts to only four-tenths of one per cent, a very considerable improvement. In addition to bringing a greater percentage of batches up to standard, we have been able to reduce in-process shrinkage. This is directly due to the more exact compounding which controls the initial measurement of any given ingredients. Human error is reduced. And, too, we have gravity controls which spot any errors before batching has progressed too far to correct it."

Production personnel are primarily concerned with the productive capacity, the flexibility and the cost factors of the new system. When asked for opinions on these, the following statements were made by Lee management:

"We now have the potential to produce a very broad range of materials, limited generally only by the ingredients we are able to introduce. Not only that, but the plant's capacity has been increased by one-third.

"Before and after time-saving comparisons are difficult to pin down because in the past we operated on very heavy overtime schedules, working on weekends and holidays to keep up with production. Now, we're still working 24-hour shifts, but because of the faster 60 rpm speed of the first cycle 11D Banbury, plus the full automation, we figure that manpower savings fall somewhere between 75 and 100 man hours daily."

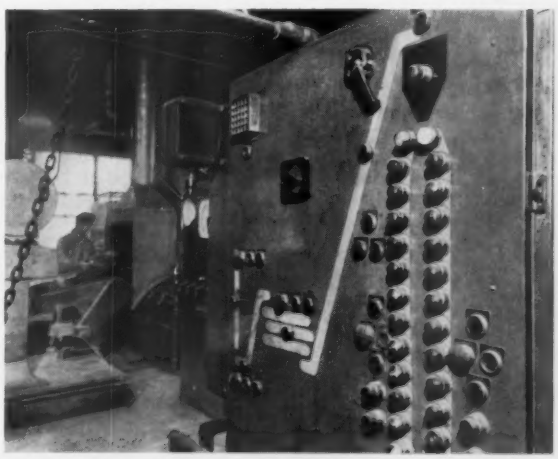

FIG. 5—The broad lines on control panel indicate path of material flow through mixer, cooler, and up conveyor to storage bins prior to final mixing of masterbatch.

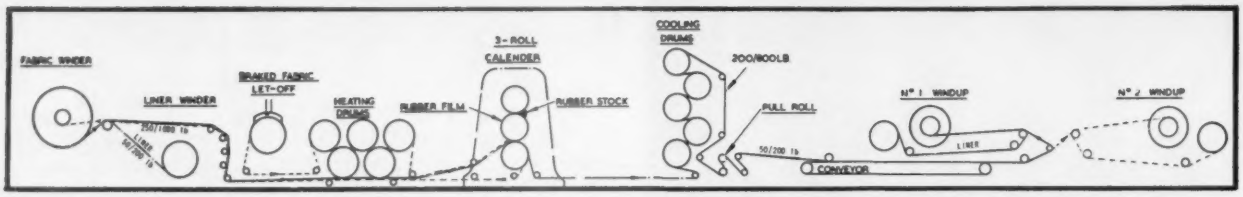

FIG. 1—Flow diagram of fabric and calender train. Dotted line is first fabric pass; solid line shows second.

Automatic Control for English Calender and Mill Installation

By LEO WALTER

Consulting Engineer, Glos., England

CONTROL requirements for two new calender and rubber mill installations at the Edinburgh Works of the North British Rubber Co. Ltd. are now being met by an electrical scheme specifically designed for the tire and hose production sequence. The control equipment permits automatic regulation of the speed and tension of the calenders, and rapid stopping of the rubber mill drives.

A flow diagram of the two-pass, fabric-coating sequence is shown in Figure 1. From the braked fabric let-off reel on the left, the material moves through steam-heated drums into the calender for coating. After the liner fabric is interposed, it moves to the winder. There the fabric is coated on the opposite side, passes on to the cooling drums (by means of pull rolls which produce and maintain web tension), and then at reduced tension, to the final wind-up reels.

Ward-Leonard drives are used for each section of the calender train. Magnetic amplifiers form the closed loop for speed and tension matching. Variable output from an exciter, common to all the generators, produces basic speed variation of the train drives.

Calender speed control uses a tacho-generator, a reference, and a magnetic amplifier for generator excitation. The latter is varied according to error between the tacho-generator and reference voltages. Amplified, it provides the desired generator excitation. The upper speed range of the calender motor uses motor field control, thus providing constant horsepower. The lower portion of the speed range is obtained at constant torque.

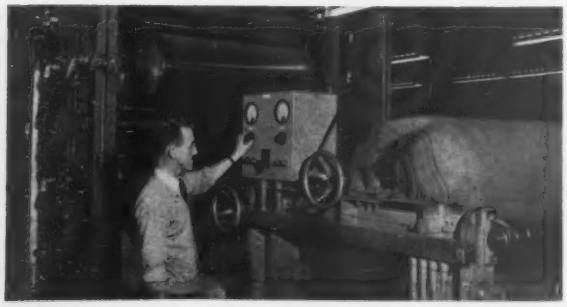

FIG. 2—Tire calender wind-up with cooling drums and pull rolls.

The speed of the fabric winder motor varies with the basic train speed, with additional control provided by reel build-up. A magnetic amplifier, used for motor excitation, controls speed during reeling and maintains the adjustable web tension between reel and calender. During the second coating pass, the winder acts as a restrainer, thus establishing tension while the motor acts as a generator, and the tension control functions as the motor control.

The motor torque of pull rolls is controlled to obtain constant web tension. From the outgoing side of the pull rolls, the web passes at reduced tension to either side of two wind-up reels, as shown in Figure 2.

Reel build-up is regulated by motor field control at constant web tension. Gear control is applied for frictioning of the rubber into the web between center and bottom calender rolls. Dynamic braking provides rapid stopping of the drives.

A motor panel adjacent to the calender allows centralized control, except for tension which is controlled from sub-panels at web and liner drives, and at the two wind-up reels. Push buttons on the master panel serve the motor-generator sets, and are used for "start," "thread," "run," "stop" and "calender inching." It is possible to inch all of the drives when they are not selected for running. The generator also controls auxiliary ac motors for screw-down, etc.

Synchronous motors for the mills are rated at 450 hp at 600 rpm, 3,300 volts, 3-phase, 50 cycles. Two of these drive mill lines in the tire department, and one in the hose section. All motors are controlled by air brake contactor equipment ensuring shortest possible roll travel down from maximum speed; dynamic braking is used.

Audio-Visual Presentations

A better way of saying what's new, when "what's new" can be depicted, or photographed, or narrated by an expert

By DOLPH FRANKLIN
Jamaica 32, N. Y.

► Marketing and sales presentation work with audio-visuals can help automate salesmen in the rubber industry. But the term "automated salesmen" should not be taken literally. Automation here implies automatic tools for presentation purposes, not ways to transform salesmen into robots. The audio-visual medium is not an on-the-spot dramatic gimmick, but a way to solve basic marketing and merchandising problems in the rubber and rubberlike plastics field. Objective: to translate abstract solutions to problems into compelling visual concepts. To do this, new approaches and new equipment have been devised by slide-film producers and audio-visual equipment makers.

Visual Communications, a New York City firm involved in the industry, advises rubber manufacturers that the only way to properly use A-V equipment is to tailor the scripts and the presentations for a specific job. No two filmscripts or treatments should be given the same feeling or use the same techniques, merely because they have been created by an art director, producer, or writer who is an expert in a given method or approach. The goal in sales presentations is not to identify the character or talent of a producer but to solve a specific sales problem effectively.

Using Visuals Effectively

Effectively made audio-visual presentations can and should be used to give different identities to divisions of rubber companies. Indeed they should be created for specific products, services, and equipment.

Hood Rubber Co. and B. F. Goodrich Footwear Co., for instance, found a way to pre-sell an entire line of women's casual shoes to thousands of dealers all over the country. Here's how: 13,000 Kodak Dye Transfer prints were ordered from Color Corporation of America; then received in a matter of days. According to James S. Barrie, Vice-President in Charge of Sales, "The 13,000 prints from CCA helped our salesmen visually present the line of 'Sun-Steps' in all its detail and exactness of color."

R. L. Shoemaker, of Charles Beseler Co., a firm which makes a line of desk-top projectors, states: "Audio-visual equipment is not gimmick stuff. It is not a matter of buying an art technique, then having the story slide through sound-film projectors. The producer must actually place himself on the company sales team, dig deep for understanding, and discover the problems requiring solution. In addition he must know to whom the salesmen will be talking, and why. Then and only then will he be able to 'talk-your-rubber story' in the right visual way."

Selling Your Salesmen

Many successful salesmen in the rubber industry are reluctant to turn to "canned" talks. They shy away from querying possible producers to find out what is available; or if interested, pre-choose techniques rather than approaching with an open mind; thus do not discover the techniques that have been perfected in the field. But this reluctance can be frequently overcome by exposing sales plans and programs in modest doses to the more willing salesmen. Forcing is not the force to effectively automate your sales crew.

Quote the *Audio Visual Review*: "Each audio-visual situation has its own problems and special needs. When the job is a simple one, a graphic flip chart may do the trick. If it is a complex theme, requiring dramatic impact on large groups, the answer may be a professionally-produced motion picture. In between lies a whole world of audio-visual techniques that are making life more efficient for American industry."

Preparing the Presentation

Preparation of audio-visuals is being handled both internally and externally. Many organizations prepare their own slides, flip charts and the like (see Table I). Some do the whole range of visual aids. Many, however, rely on the help of outside specialists, the audio-visual producers. No matter who does it, the fact is that more and more audio-visuals are being employed.

Jack Flynn, supervisor of public relations photography at Union Carbide, reports: "Our vinyl foam division makes excellent use of audio-visual equipment and techniques. We use 2 by 2 slides, automatic projectors and 8 by 10 transparencies for use with light boxes. We have set up an audio-visual pool to supply conference rooms throughout the building. Salesmen in at least three of our divisions use portable projectors."

Marshall Sewell, Manager of Publications and Films in the public relations department at U. S. Rubber, reports: "Lightweight portable projectors are lent to tire dealers to merchandise tires to prospects. They find them very effective. Our Footwear Division uses desk-top Salesmates."

Technical Animations Inc., Port Washington, N. Y., has developed a new technique to add motion to any ordinary still transparency; motion in any direction, at any speed and any combination of directions and speeds. Technamation reproduces naturally moving elements—it makes liquids flow, gases explode, fires burn, plastics mold, gears rotate and rubber stretch. It adds any other motion effect to attract or focus attention, sustain inter-

est and enhance the impact of any medium of visual communication.

Technamation accomplishes its motion effects without intricate moving parts or without the costly sequential still drawings required in conventional animation techniques. The motion effect is continuous and free of flicker or stroboscopic effect. It can be illuminated from the rear in a light box type of display or exhibit, it can be projected by conventional overhead or slide projection, it can be photographed for motion picture use or television.

Quote American Optical Company, Inc., Buffalo, N. Y.: "In any training situation, motion holds attention and adds to both understanding and retention, especially where complex or technical material is involved."

Audio-visual presentation is effective for a large group — or small one.

Selectivity

Technamation training aids have the advantage of selectivity—enabling the instructor to focus on particular movements for extended discussion of their implications. The potential of Technamation is suggested by some of the training aids developed for pilot and flight engineer indoctrination in the operations of jet engines. Operating elements of the engine, air intake, compression, combustion and propulsion, as well as fuel flow, temperature changes and all mechanical operations are clearly shown in full motion."

The technique can readily be used to depict the actions of autoclaves, Banbury mixers, braiders, centrifuges, conveyors, fatigue looms and testers, masticators, molds, stitchers and tire building machines.

Another new development in the 16 mm. movie field is the advent of magnetic striping. This permits a narrow band of material along the edge of the film to pick up commentary spoken into a microphone working in harmony with a projector. This allows for unlimited flexibility and economical use of a high-quality film. For example, you can show the film to production engineers with a technical commentary on accelerators, antioxidants, asphalt, barytes, carbon black, clay, ground mica, lithopone, sulphur, tire fabrics or zinc oxide—then change the text on the same film for a less sophisticated or knowledgeable audience.

Additional Data

A comprehensive list of PR Films and Filmstrips produced for the rubber industry is available from C. C. Miller, Rubber Manufacturers Association, Washington, D. C. The National Visual Presentation Association, New York City, a non-profit organization, uniquely numbers among its members representatives from both producers and users of visuals.

This central information center can lead rubber manufacturers to sources of supply; provide examples of how others solved problems similar to yours; and assist in solution of technical and production problems.

TABLE I — CHECKLIST FOR PLANNING AUDIO-VISUAL PRESENTATIONS

- ☐ (1) Check into size of audience: this will help determine equipment to be used.
- ☐ (2) Check into preparation needs: find an expert production source for the specific equipment you decide to use—
  - ☐ Self-contained portable film strip unit with synchronized sound
  - ☐ Combination of strip projector and phonograph 8 mm./16 mm. sound projector
  - ☐ Slidefilm projectors
  - ☐ Flip-top projectors with tone arm levers
  - ☐ Multi-purpose rear view projectors
- ☐ (3) Check into cost range:
  - ☐ Slides—medium original cost, low duplication cost
  - ☐ Flip charts—medium original cost, medium duplication cost
  - ☐ Filmstrips—medium original cost, low duplication cost
  - ☐ Sound Filmstrips—medium original cost, low duplication cost
  - ☐ Motion Pictures—high original cost, low duplication cost
- ☐ (4) Check into place-of-use of equipment:
  - ☐ Portable desktop projectors have an advantage in sales and customer relations areas for use in offices and conference rooms.
  - ☐ Heavy equipment and motion picture projectors are used to best advantage in your headquarters and auditoriums.

SPECIAL INDUSTRY REPORT

EDITORIAL

Ferment and Progress

► With each passing year we are struck by the enormous diversity and complexity of the rubber industry in all its manifold activities. What is even more astounding is the aplomb with which the industry manages to handle its problems and forge ahead. Synthetic rubber is an excellent case in point. In the past few years how many new elastomers have been introduced? Quite a few. In a recent address a leading industry figure pointed to the fact that rubber technology has now reached the stage in which just about any kind of rubber which is desired can be produced. Development of the stereospecific types has given us the know-how to control both the chemistry and the molecular structure of synthetic rubber so that polymers may be fashioned precisely to specification.

All of this means that our compounders are beginning to work with materials which were unknown just a few years ago. It means that our suppliers have been busy anticipating and meeting new requirements. It means that our marketing people have been busy in attempting to gauge new markets—and management has been busy in making plans for new capital expenditure.

It means that all of us—in all our different capacities—have been probing, experimenting, gauging, discussing, estimating, having second thoughts, coming up with new ideas. It is a stimulating experience. The local rubber groups and the ACS Rubber Division have been doing a very good job in planning their programs. Certainly, no one in the rubber industry can say that there are few opportunities to obtain information on what is new and what is pertinent.

True enough, competitors may often scoff at one another's claims—suppliers get a little upset from time to time. But from this ferment—from this churning action of the free competitive market come products and processes which are the hallmark for the world.

We tend to quibble about our deficiencies and often overlook the end result. You may have trouble keeping up with all the new rubbers which have been introduced in the last few years. But how much better a situation this is than to have someone in government tell you how much and what to produce!

If some of the newer synthetic rubbers fail to meet market requirements they will fall by the wayside. And this is the way it should be. Others, however, will survive. And these will be the rubbers which will be suited to the purpose, profitable to sell and profitable to use.

Let us encourage the development of new things. More importantly, let us encourage the capacity to absorb new ideas. Let us instill in the minds of the younger people joining our industry that the most significant attribute they can bring to their jobs is a willingness to learn, for only in this way comes the progress and the profit we seek.

NEWS REPORTS

and industry activities

NOVEMBER, 1961

NBS Produces Polymers By Gamma Radiation

► The National Bureau of Standards is investigating the use of gamma radiation under high pressure to produce polymers from monomers that ordinarily do not polymerize. By exposing substances to gamma radiation under high pressure, the NBS has prepared polymers from normally non-polymerizing monomers, such as carbon disulfide. The reaction is initiated by the radiation and favored by pressure. According to the NBS, with such a combination of conditions, solid polymers can be obtained from monomers which, at best, normally produce oils.

Preparation of the polymers, carried out by L. A. Wall, D. W. Brown, and R. E. Florin of the NBS staff, is part of a program for the U. S. Army Research Office. Initiated to increase knowledge of radiation and polymerization kinetics and mechanisms, the program may provide a basis for production of new types of polymers, the NBS states.

According to the NBS, many molecules that have double or triple bonds in their chemical formulas do not form macromolecules under usual conditions. In general, when attempts are made to polymerize such molecules, the chemical equilibrium shifts toward monomer instead of polymer production. However, if high pressure is applied, the equilibrium will be displaced to favore polymerization. Pressure also increases the rates of certain reactions producing high polymers, at the expense of other reactions that would tend to prevent polymer formation.

In the NBS study, degassed liquid monomers are distilled under vacuum to a detachable pressure bomb and compressed under high pressure before being exposed to gamma radiation. The monomers are degassed and kept free of air to eliminate the possibility of interfering reactions with oxygen.

Although the data gathered in the preliminary experiments are not sufficient to warrant detailed conclusions, some general theories have been formulated. It is assumed that under specific conditions of pressure and irradiation, sufficient collisions occur between molecules to support the polymer growth. The monomers and fragments produced by radiation must be able to diffuse through the medium in order to combine.

Because the application of high pressure produces a more viscous and less diffusible material, the temperature of the substance must be raised enough during an experiment to overcome such an effect. Thus, a moderate constant temperature is maintained throughout the experiment to prevent crystallization and to promote diffusion. If the material is in a liquid phase, with propagating centers surrounding the monomer molecules, diffusion should be no problem, according to the National Bureau of Standards.

Protect Latex in Winter

► With the approach of the winter season, all latices must be protected from gellation and freezing. Although latex shipments are made in either insulated or heated equipment, it is recommended that upon receipt the latex be immediately removed from loading docks to heated quarters. If the latex should arrive in a gelled or semi-solid state, it should be warmed gradually *without agitation* to a temperature of about 100°F. This is best done by means of storage in a heated room for 48 hours. Usually, this treatment will restore the latex to its normal state. If not, the latex has probably been frozen. In this event, notify the supplier and he will inspect the material to determine the cause of flocculation and, if possible, make further recommendations.

Red China Increasing Rubber Production

► Red China is making a concerted effort to increase both synthetic and natural rubber production in order to meet its rubber consumption demands, according to an article appearing in a recent issue of the Soviet magazine *Kauchuk i Resina*. The article states that in 1962, the Red Chinese will need 2.5 times more automobile tires, 2.7 times more bicycle tires, 3.7 times more conveyor belts, and 40 per cent more rubber footwear than in 1958. The 1958 demand for these items was not reported.

In order to meet this expected increase in rubber consumption, Red China is now producing butadiene-styrene rubbers, as well as butadiene-nitrile and polychloroprene rubbers. They have developed rubber plantations in areas of southern China, and the planting of hevea rubber trees has increased by 30 times since 1949. The consumption of natural rubber has increased 11 times since 1949.

The article also mentioned that production of carbon black has been expanded and some 20 different types of blacks are now being produced. Factories are being built for the manufacture of both nylon-6 and viscose tire cord.

With all this activity, the article notes that every effort must be bent on developing raw material sources, expanding the machine industry, organizing scientific research institutes, and improving the technology and development of synthetic rubber production.

► B. F. Goodrich, Akron, Ohio has established TBA centers in department stores in Sarasota and St. Petersburg, Fla., and St. Paul, Minn. The firm also plans two new centers in St. Louis, Mo., and one each in Minneapolis, Minn., Wilmington, Del., and Jamaica, N. Y. this year.

Fort Wayne Holds Panel on Polymers

► Four representatives of the Polymer Corp., Sarnia, Ontario, Canada, comprised the panel of speakers at the technical meeting of the Fort Wayne Rubber & Plastics Group, held on September 28, 1961, at the Van Orman Hotel, Fort Wayne, Ind. The meeting was attended by over 150 members and guests. The topics discussed were: "*Cis* 1,4 Polybutadiene in Non-Tire Applications" by Z. J. Dorko; SBR Copolymers, Resins, and Latices: New Types and Applications" by Dr. E. E. Gale; "Butyl Rubber — New Types and Grades" by R. C. Klingender; and "Improving Ozone Resistance of Nitrile Rubber" by William Abrams.

Mr. Dorko, the first speaker, stated that excellent abrasion resistance and high resilience were two of the outstanding characteristics of *cis* 1,4 polybutadiene of very high *cis* content. Besides these characteristics, Mr. Dorko elaborated on the other fundamental properties of polybutadiene such as good low temperature retraction, very low water absorption and low heat build-up, and where the rubber industry can take advantage of these in non-tire applications.

The next panelist, Mr. Gale, spoke about the trend in recent years to easier processing polymers of the SBR type, enlarging on the use by Polymer Corp. as early as 1957 of a mixing index scale which enabled the factory processing of the Polysar Krynols (OEP) to be predicted. The use of such a factory processing index, he stated, allowed the factors in the polymerization system governing good processing to be determined.

The trend to black masterbatch was also plotted by Mr. Gale, first of all as a function of mixing capacity. In his opinion, the trend for quality reasons has never been fully proven. However, the trend is continuing today as an acceptable method whereby the high structure furnace blacks can be incorporated into tread compounds allowing an acceptable degree of safety from a factory processing point of view.

Mr. Klingender, the next speaker, briefly reviewed the butyl rubbers produced by Polymer Corp., emphasizing the newer specialty grades (Polysar Butyl 101, 450, and 600). He remarked that the first of these specialty butyls has been used primarily in chewing gum base. He explained that with the increased interest in the United States for FDA approved materials, this elastomer is finding new uses in food conveyor belting and as a coating material in conjunction with wax in the food packaging industry. For the other specialty butyl rubbers, Mr. Klingender described their use in such unique applications as roofing, bridge bearing pads, and wharf bumpers.

The final panelist, Mr. Abrams, led up to the introduction of easy processing nitrile rubbers by Polymer Corp. in 1950 with the development of the Polysar Krynacs produced in a cold polymerization system. Ozone resistance in nitrile rubber vulcanizates has always been a problem with the rubber compounder, and Mr. Abrams elaborated on how this property could be improved through the use of polyvinyl chloride and the means whereby it can be easily incorporated during the regular factory mixing cycle.

E. L. Davis

J. W. Messner

In United Carbon Assignments

► United Carbon Co. has named E. L. Davis and John W. Messner technical service representatives at its Service Laboratory in Akron, Ohio. Mr. Davis, a graduate of Henderson (Ark.) State College, had been associated with the Ried Rubber Co. in New Zealand and the B. F. Goodrich Co. Prior to joining United Carbon, Mr. Davis was with the Dayton Rubber Co. as manager of tire compounding. He is a member of the Akron and Southern Ohio Rubber Groups.

Mr. Messner, a chemistry graduate from Kent State University, had worked for the Goodyear Tire & Rubber Co. prior to joining United Carbon as a trainee in its Field Technical Service Department. He is a member of the American Chemical Society and the Akron Rubber Group.

Stockman Gets New Post

► Dr. Charles H. Stockman, formerly manager of research operations at the B. F. Goodrich Co. research center in Brecksville, Ohio, has been named vice-president and general manager of Goodrich High Voltage Astronautics, Inc., Burlington, Mass. The firm is a joint enterprise of B. F. Goodrich and High Voltage Engineering Corp., Burlington. Dr. Stockman joined the Goodrich research staff in 1950 as a chemical engineer, the year he received his Ph.D. degree from Purdue University.

► Molded Fiber Glass Companies, Ashtabula, Ohio, has announced that its research and testing laboratories at Ashtabula have been made available without charge to assist customers in materials selection, product design and quality control.

Akron Polymer Group Sponsoring Lectures

► The Akron Polymer Lecture Group is currently sponsoring a program of lectures under the auspices of the University of Akron, Akron, Ohio, covering many different aspects of polymer technology. The program provides for one lecture each month to be presented by an expert in the field. The series began on August 4, 1961 with a "bonus lecture" which completed the 1960-61 series. This lecture was presented by Professor J. W. Breitenbach of Vienna University and covered the subject, "Electrochemical Initiation of Polymerization."

First Lecture Held

The first lecture of the 1961-62 season was held on October 6 and featured a talk on "The Relationship Between Structure and Properties in Urethane Polymers" by Dr. J. H. Saunders of the Mobay Chemical Co. A lecture scheduled for November 3 was to have been devoted to "Why Polymerization Occurs" by Professor F. S. Dainton of the University of Leeds. Dates, subjects and speakers of future meetings follow:

December 1, 1961—"Some Optical Studies of the Morphology of Crystalline Polymers" by Professor R. S. Stein, University of Massachusetts.

January 5, 1962—"Infrared Spectroscopic Studies of Polymers" by Professor S. Krimm, University of Michigan.

February 2, 1962 — "Viscoelastic Properties of Dilute Polymer Solutions" by Professor John D. Ferry, University of Wisconsin.

March 2, 1962—"Studies on the Mechanism of Olefin Polymerization by Ziegler-Type Catalysts" by Dr. W. L. Carrick, Union Carbide Plastics Co.

April 6, 1962—"Some Aspects of the Flow of Polymer Melts" by Dr. E. B. Bagley, Canadian Industries, Ltd.

May 4, 1962 — "Stabilization of Polyolefins by Thermal Oxidation" by Dr. W. Lincoln Hawkins, Bell Telephone Laboratories.

Additional information on the polymer lecture series or on other activities of the Akron Polymer Lecture Group may be obtained by writing to L. E. Forman, secretary, c/o Firestone Tire & Rubber Co., Akron 17, Ohio.

George R. Vila, second from left, president of the U. S. Rubber Co., was the after-dinner speaker at the joint meeting of the New York, Philadelphia, and Connecticut Rubber Groups. He is seen with the respective rubber group chairmen, left to right, Henry J. Peters (Bell Telephone Laboratories), New York, Richard Hendrikson (Phillips Chemical), Philadelphia; and Frank B. Smith (Naugatuck Chemical), Connecticut.

New York Sponsors Joint Meeting

► Over 375 members of the New York, Philadelphia, and Connecticut Rubber Groups attended a Joint Technical Meeting on October 20, 1961, at the Henry Hudson Hotel in New York City. Four papers were presented at the technical meeting, which was arranged by Ralph DeTurk (Beckham Co.), vice-chairman of the New York Rubber Group. George Vila, president of the U. S. Rubber Co., was the after-dinner speaker.

1962 New York Officers

Following the technical session, the New York Rubber Group held a brief business meeting at which Lester Koch (Westwood Chemical), chairman of the Nominating Committee, named and introduced the recently elected New York officers and directors for 1962. They are: *Chairman*, Ralph DeTurk (Beckham Co.); *Vice-Chairman*, Americus H. Woodward (DuPont); *Secretary-Treasurer*, M. E. Lerner (RUBBER AGE); *Sergeant-at-Arms*, Frank J. Raba (American Cyanamid); *Directors*, W. F. Wade (Acme Hamilton), Glenn C. Vickery (General Tire), James V. Fusco (Enjay Chemical), and George Winspear (R. T. Vanderbilt).

The first paper at the technical session was "Properties of Carbon Black Reinforced, Chemically Cross-Linked Polyethylene" by P. R. McClure (Cabot). Mr. McClure stated that as a result of their excellent properties, cross-linked polyethylenes reinforced with carbon black are moving out of the laboratory into commercial production. He explained that the formulations based on low density resins have excellent physical, chemical, and thermal properties, and their electrical properties are adequate for a wide range of uses. In addition, weathering resistance is outstanding.

According to Mr. McClure, with the availability of cross-linking agents having higher "kick-off" temperatures, it has become possible to cross-link high density polyethylene resins. This results in a substantial improvement in strength properties, especially at elevated temperatures, he stated.

The next speaker, H. E. Railsback (Phillips Petroleum), in his talk on "Stereo Elastomers" stated that as a result of Phillips' research program on butadiene monomer, hundreds of polybutadiene elastomers have been made having widely varying *cis*, *trans*, and vinyl structures. According to Mr. Railsback, the product of greatest commercial interest is *Cis*-4 polybutadiene of about 95 per cent *cis* content. He explained that due to the low heat build-up and excellent abrasion resistance, this material has given outstanding performance in tire tread and carcass compounds.

He pointed out that *trans*-polybutadiene of 85 to 90 per cent *trans* content is another interesting polymer for use in hard rubber stocks.

It is currently being marketed from a semicommercial plant. The speaker informed the group that a butadiene elastomer under market study is a 75/25 butadiene-styrene copolymer of interest for wire and cable, shoe soles, and molded goods applications.

Ethylene-Propylene Rubber

E. L. Borg (Naugatuck Chemical), in his talk on Ethylene Propylene Rubber," stated that the common commercial homopolymers of the two simplest alpha olefins, ethylene and propylene, are crystalline thermalplastics. He explained that neither, without significant molecular modification, can properly be called a rubber. Mr. Borg pointed out that amorphous copolymers of ethylene and propylene are elastic materials which qualify as rubbers in both the raw and cured states, and ethylene propylene rubber, or EPR as it has come to be called, is an interesting addition to the growing family of synthetic rubbers.

According to the speaker, it can be processed on conventional equipment and reinforced in much the same way as the more common synthetic rubbers. He remarked that in a recipe with sulfur and an organic peroxide, EPR will give a cured vulcanizate under normal conditions of time and temperature. He added that the EPR vulcanizates exhibit excellent resistance to oxidative and ozone degradation and good electrical properties. Mr. Borg also pointed out that their physicals are in the SBR range while their low temperature properties and flex resistance are superior to those of that general purpose synthetic rubber.

Sulfur Curable EPR

"A Sulfur-Curable, Ethylene-Propylene Elastomer" was the subject of the talk presented by C. C. McCabe (DuPont), the final speaker at the technical session. According to Mr. McCabe, this amorphous polymer, a new hydrocarbon elastomer synthesized from petrochemical intermediates using coordination catalysts, resembles commercial diene elastomers in general appearance; is completely soluble in hydrocarbon and chlorinated hydrocarbon solvents; and is stable to prolonged storage. He pointed out that it can be vulcanized effectively by the use of accelerated sulfur systems and reinforced by numerous fillers such as carbon blacks, clays, and certain silicas.

Ralph DeTurk (Beckham Co.), left, program chairman of the joint technical meeting, poses with the panel of speakers, left to right, C. C. McCabe (DuPont), E. L. Borg (Naugatuck Chemical), H. E. Railsback (Phillips), and P. R. McClure (Cabot).

Mr. McCabe stated that reinforced vulcanizates are strong, resilient, and extremely resistant to oxygen, ozone, heat, light, and many chemical agents. He said that properly compounded vulcanizates exhibit excellent electrical and low temperature properties, and their permeability to gases, specifically nitrogen, oxygen, and carbon dioxide, parallels natural rubber,

Mr. Vila, in his after-dinner remarks, stated that it was exactly 22 years ago—1939—since he had attended a New York Rubber Group meeting. He cited specific events of 1939 and compared them with similar events in 1961. He pointed out that when we compare the population, automobile production, and rubber consumption in 1939 with that of 1961, we find that as the population has risen 39 per cent, automobile production has moved ahead 74 per cent, and rubber consumption has shot up 152 per cent. Mr. Vila emphasized that this indicates the type of growth industry we are associated with, and it has grown more than twice as fast as the automobile industry.

He also stated that not only is the rubber industry bigger today, it is different in many ways. In 1939, he said, there was one type of rubber—natural—and one type of fabric—cotton—and a limited number of rubber chemicals. Today the rubber industry uses little cotton but tremendous amounts of rayon and nylon and it won't be long until other synthetic fibers enter the picture.

Mr. Vila pointed out that we have reached the stage in rubber technology where we can produce just about any kind of rubber we wish. He said that the development of the stereo specific types has given us the know-how to control both the chemistry and the molecular structure of synthetic rubber so that we may fashion polymers precisely to specification.

The 1962 officers and directors of the New York Rubber Group. Left to right, Frank J. Raba (American Cyanamid), Sergeant-at-Arms; M. E. Lerner (Rubber Age), Secretary-Treasurer; Glenn C. Vickery (General Tire), Director; Americus H. Woodward (DuPont), Vice-Chairman; Ralph DeTurk (Beckham Co.), Chairman; James V. Fusco (Enjay Chemical), Director; and W. F. Wade (Acme Hamilton), Director. Not in photograph: George Winspear (R. T. Vanderbilt), Director.

Goodyear Triples Cobalt-60 Supply

► Goodyear Tire & Rubber Co., Akron, Ohio, has tripled its supply of radioactive Cobalt-60 in a stepped-up program to explore the effects of nuclear energy upon rubber and plastics. By increasing its source of Cobalt-60 to 11,000 curies, the firm's Akron research headquarters has become one of the largest industrial radiation research facilities in the country.

According to Dr. H. J. Osterhof, director of research, Goodyear has set a four-fold goal for its intensified radiation research program:

(1) To perfect methods of vulcanizing rubber by radiation, the first basically new vulcanizing method since Charles Goodyear discovered the conventional heat-and-sulfur method 122 years ago.

(2) To create entirely new types of rubbers and plastics by using radiation as a polymerization catalyst, joining molecules of basic materials to form the large, more complex rubber molecules.

(3) To develop rubber compounds not easily damaged by intense radiation, from which such products as belts, hoses, and gaskets can be made for use in highly radioactive environments.

(4) To test space projects, such as an experimental manned space station built for NASA by the subsidiary Goodyear Aircraft Corp. The rubberized fabric station can be folded into a small package, boosted into orbit, then inflated into shape. In space, it would be bombarded by cosmic rays similar in effect to the gamma rays emitted by cobalt, making it essential to know the effect radiation may have upon its construction.

First Cobalt Source

Goodyear installed its first cobalt source in 1956, 10 years after it first entered the radiation research field by developing a beta gauge for production gauging of packaging films.

The new 11,000-curie supply of cobalt slugs is housed at Goodyear in the bottom of a concrete-and-aluminum-lined well under 17 feet of water which, like lead, acts as a protective shield. When in use, it is raised by a remote-controlled elevator to a concrete "cave," whose four-foot thick walls safely contain its powers.

A nuclear scientist doublechecks against radiation traces over the glowing cobalt, now at rest at the bottom of a 17-foot-deep well at the Goodyear Radiation Research Laboratory.

Booton Succeeds Cady

► Robert W. Booton has been named factory manager of the Indianapolis, Ind., plant of the U. S. Rubber Co., succeeding John E. Cady who has retired after 41 years of service. Mr. Booton had been quality control manager of the plant since 1959. He holds a B.S. and M.S. degree in economics from the University of Kentucky, and joined the rubber company in 1943 as a member of the quality control department of the Indianapolis plant. From 1950 to 1956, Mr. Booton served as production foreman, and for the following two years he was general foreman. After a year as acting production superintendent and acting manager of quality control, Mr. Booton was appointed plant quality control manager. Mr. Cady, who had been factory manager since 1942, joined U. S. Rubber as a chemist in the Indianapolis plant in 1920 after receiving a chemical engineering degree from Purdue University.

Color Tells Tire Wear

► Airplane tires that change color when they are worn enough to need replacing are being manufactured by B. F. Goodrich Co., Akron, Ohio. A layer of colored rubber under the tread is exposed when the tread is worn through. Because the colored rubber covers the entire undertread area, it shows every spot where the tread is worn through, including flat spots and gouges that cannot be detected by ordinary inspection methods, the company stated.

Connecticut Group Holds Annual Outing

► The Connecticut Rubber Group held its 16th Annual Outing on September 16, 1961, at Grassy Hill Park in Derby, Conn. F. H. Browning (Cabot) served as general chairman of the outing, which was attended by 212 members and guests. The outing included a number of events as well as a golf tournament, with prizes being awarded to the winning participants.

Chairmen of the individual events were: *Softball,* C. Larson (Wyrough & Loser); *Horseshoes,* R. Ward (DuPont); *Golf,* G. Sprague (Goodrich); *Egg Throw,* F. Villa (Whitney Blake); *Greeting,* E. Schwartz (Southern Clay); *Bocci,* H. Gordon (Bond Rubber); *Volley Ball,* J. Mitchell (Seamless Rubber).

The event winners were: *Softball,* A. DiMicco, K. Rich, C. Yaculics, A. Varshelka, W. Ekman, W. Daunis, H. Nallinger, V. Chadwick (all of Armstrong Rubber), and J. Petro and D. McNulty (both of Whitney Blake); *Horseshoes, Singles,* A. Merritt (Goodyear), *Doubles,* F. Pennell and E. Warner (both of Armstrong-Norwalk); *Egg Throw,* T. Kelly (R. T. Vanderbilt) and V. Chadwick (Armstrong Rubber); *Bocci,* W. Baulieu (Jenkins Valve), E. York (Armstrong Rubber), and A. Goldstein (Bond Rubber); *Volleyball Team,* E. Mulcahy, H. Beadl, W. Cornel, R. Jack, and P. Whitman (all of R. T. Vanderbilt).

Golf Tournament, First Low Gross, A. Murdoch, Jr. (Armstrong Rubber), *Second Low Gross,* R. Stimets (United Carbon), *Third Low Gross,* R. Ekwall (U.S. Rubber); *First Low Net,* A. Merritt (Goodyear), *Second Low Net,* J. Mickiewicz (Goodrich), *Third Low Net,* L. Longworth (Monsanto).

Ram Names Blackburn

► Ram Chemicals Manufacturing Co., Gardena, Calif., has appointed Bill O. Blackburn as chief chemist for Garan Laboratories and other affiliated Ram Chemical organizations. Mr. Blackburn will supervise all research laboratory work and a newly expanded quality control section for Ram. He was formerly associated with Shell Chemical Co. for 26 years. While with this company his experience covered epoxy resins, synthetic rubber and other high polymers.

Chicago Told About Food Additives Act

► "The Food Additives Act: Interpretations and Status of Rubber Industry Interests" was the topic under discussion at the technical meeting of the Chicago Rubber Group, held on September 29, 1961, at the Furniture Mart in Chicago, Ill. The two speakers at the technical session were R. E. Lamb (Waukesha Rubber) and Dr. Paul G. Roach (Texas-U.S. Chemical). Mr. Lamb presented a progress report on the activities of the Subcommittee on Food Additives of the Rubber Manufacturers Association, and Dr. Roach gave a talk entitled "Klarified Konfusion."

Subcommittee Activities

Mr. Lamb presented a history of the activities of the RMA Food Additives Subcommittee, from its beginning when the Food Additives Act was first enacted in 1959 to the present. He explained the multitude of work involved before the Subcommittee submitted to the FDA data on methods of tests and limits on extractability. In discussing the future, Mr. Lamb remarked that the rubber industry has been operating on a *status quo* basis for almost a year, and can do so until January 1, 1963. The speaker offered the following recommendations: chemical suppliers identify components in gross extract of typical formulations; don't go to Washington with a recipe; and work through the Rubber Manufacturers Association.

Allowances and Restrictions

Dr. Roach, in his discussion, explained that rubber manufacturers must decide whether their products are affected by the Food Additives Act. He pointed out that the product is not affected if: during use, it cannot reasonably be expected to become a component of food. The degree of exposure is important; during use, product imparts component to food when component is generally recognized as safe (GRAS); and use of product specifically sanctioned or approved by FDA prior to September 6, 1958.

According to the speaker, the product is affected by the law if: during use, the product can be expected to become a component of food; component is not GRAS; or the product is not on prior sanction.

Discussing the Food Additives Act technical program of the Chicago Rubber Group are, left to right, Robert Kann (Goodyear), vice-president and program chairman of the Chicago Rubber Group; Dr. Paul G. Roach (Texas-U. S.) and R. E. Lamb (Waukesha Rubber), program speakers; and Ted C. Argue (Roth Rubber), president of the Chicago Rubber Group.

Markets Protektor Waxes

► A range of sun-proofing waxes which are said to protect rubber from aging are being marketed by Heka Imports & Exports, Inc., New York, N. Y. Called Protektor G-Waxes, they are complex mixtures of normal paraffinic, iso-paraffinic and naphthenic solid hydrocarbons, precisely tuned to the purpose of acting as a protector in rubber mixtures. According to Heka, the waxes give a thin homogeneous film on the finished rubber products and because of the high flexibility of these waxes this coat is unbreakable. In addition, this thin homogeneous protecting film formed on the rubber surface, comes out of the rubber mixture and will continue to regenerate itself from the inside over a long period of time.

Protektor G also is said to hinder the ozone in its attack on the double combinations in rubber, thereby accomplishing a considerable slowdown in crack forming. The company states that Protektor G is of special significance for cables used as high tension conductors, since its special chemical and physical properties makes it resistant to hot air and gives an effective defense against oxidation of rubber.

► International Latex Corp., Chemical Division, Chicago, Ill., has announced the appointment of O'Connor & Co., Inc., Chicago, as sales representatives for Tylac latices in Illinois, Indiana and lower Michigan.

ASME Holding Meeting

► The American Society of Mechanical Engineers will hold its Winter Annual Meeting on November 26 to 30, 1961, at the Statler Hilton and Governor Clinton Hotels in New York City. The Rubber & Plastic Section of ASME will meet on November 27, and will feature four papers on rubber processing and application.

The papers and their authors are: "Load Bearing Characteristics of Butyl Rubber" by D. F. Kruze (Enjay Laboratories); "The Ko-Kneader System: A New Concept for Continuous Intensive Mixing" by R. W. Miler and H. F. Irving (Baker Perkins); "Constrained Layer Damping Applied to Printed Circuit Boards" by L. J. Schwemmer and T. J. Loftus (Lord Mfg.); and "Flexible Tie-Downs for Railroad Lading" by J. W. Sherrick (Lord Mfg.).

There also will be seven papers dealing with plastics processing and application.

New Plant Opens

► Georgia Marble Co., Tate, Ga., has announced that its Calcium Products Division plant at Adams, Mass. has begun operations. This facility is producing both wet and dry ground calcium carbonate pigments and fillers for the rubber, paint, plastic and other chemical industries. The new manager of the Adams plant is Mervin J. Voelker, a graduate of Michigan School of Mines.

Bjorn F. Benson

In Allied Chemical Post

► Bjorn F. Benson has been named manager of tire technical service for the Fiber Marketing Department of the National Aniline Division of Allied Chemical Corp., Akron, Ohio. Mr. Benson received his B.S. degree in chemistry from Oregon State University in 1936, and then served with the B. F. Goodrich Co. in various technical capacities for 10 years. In 1946 he joined the Inland Rubber Corp. as technical superintendent, and in 1949 joined the Industrial Rayon Corp. in its Tire Cord Evaluation Research Department. He was named market development manager of that department in 1958, a position he held prior to joining Allied Chemical.

Lucidol Opens New Lab

► The Lucidol Division of Wallace & Tiernan, Inc., Buffalo, N. Y., has opened a new research center in Buffalo. The $750,000 building houses five laboratories, including analytical research, application research, new products research, product and process development, technical service and quality control. The center also contains an extensive library, conference rooms, private offices, and luncheon rooms for personnel.

Bearfoot Sole Expands

► A $400,000 expansion program to provide more attachable whitewalls for tires and bottoms for shoes has been started by Bearfoot Sole Co., Wadsworth, Ohio. The company announced that $193,000 worth of new machinery has already been installed at its plant and that the remaining $207,000 worth of machinery will be installed by February 1, 1962.

Nason Joins Mobay

► B. Ross Nason has joined Mobay Chemical Co., Pittsburgh, Penna., as director of manufacturing and engineering. Mr. Nason holds a B.S. degree in chemistry and an M.S. degree in chemical engineering from the University of Maine. He was formerly associated with Monsanto Chemical Co. where, since joining the company in 1950, he held positions as director of manufacturing, assistant director of engineering and plant manager in the firm's Inorganic Division.

The company also announced that S. P. Thomes, director of engineering for Mobay since 1958, has joined Monsanto Chemical Co. as construction superintendent in charge of a new ethylene plant now being built as part of Monsanto's Chocolate Bayou project near Alvin, Texas. Before joining Mobay, Mr. Thomes was superintendent of design and construction for the Chemstrand Corp. in Pensacola, Fla.

Stabilizer Business Sold

► Harshaw Chemical Co., Cleveland, Ohio, has sold its vinyl stabilizer business to Ferro Chemical Division of Ferro Corp. The sale includes all formulations, production techniques, inventory, sales technical service, development and research records. Sales contacts will be assumed by Ferro representatives, and Ferro plans to assure continued availability of experimental and special materials as well as standard items.

Labor Notes

► The recent strike at the Ford Motor Co. affected two departments at the Goodyear Tire & Rubber Co., Akron, Ohio. Employes in the Airfoam and Auto Floor Mat Departments were on a temporary work schedule of less than five days a week during the strike.

► The Barberton, Ohio, plant of the Midwest Rubber Reclaiming Co. signed its supplementary agreement with the United Rubber Workers union Local 77 on August 31. The new agreement went into effect on September 27.

Walter J. Hood

Joins Paul O. Abbe

► Paul O. Abbe, Inc., Little Falls, N. J., has appointed Walter J. Hood to its technical sales staff as a sales engineer. Mr. Hood has been active in the chemical process equipment field for over 12 years. He is a graduate of the University of Wisconsin with a B.S. degree in chemical engineering, and did post-graduate work at Stevens Institute of Technology in chemical engineering and the economics of engineering. During World War II, Mr. Hood served in the U. S. Navy as an engineering officer.

Akron Rubber Courses

► Twelve informative lecture-discussion meetings on rubber compounding are now being conducted by the University of Akron, Akron, Ohio. F. W. Wilcox (Witco Chemical) opened the series on Sept. 25, with a lecture on the historical development of the rubber industry and a brief review of natural rubber. Courses are being held weekly and will run through December 11. A lecture series dealing with Elastomer Vulcanization is planned for the spring semester, the University also announced.

Baird Buys Barlow

► Baird Chemical Industries, New York, N. Y., has purchased Barlow Chemical Corp., Ossining, N. Y., in a straight cash deal. Barlow plans to manufacture several amine compounds for use as urethane catalysts under the new arrangement. Baird plans to market Barlow's present products and to develop the firm's commercial outlets both in the United States and abroad.

Buffalo Hears Sheets On Magnesium Oxides

► "Magnesium Oxides in Elastomers" was the subject of a talk presented by Clay Sheets, Jr., of the Merck Marine Magnesium Division, at a technical meeting of the Buffalo Rubber Group, held on October 10, 1961, at the Hotel Westbrook, Buffalo, N. Y. The after-dinner speaker was W. M. Alexander, of the Federal Bureau of Investigation, who spoke on "Activities and Functions of the FBI."

Two Types Available

In his talk at the technical session, Mr. Sheets remarked that two general types of magnesium oxide are available to the rubber compounder —and the two types differ in their purity and surface activity or rate of reaction with acid. He stated that the heavy calcined magnesium oxide designation refers to a highly calcined, inactive type which finds rather limited use in current compounding. However, the active types are a necessary and important compounding ingredient for elastomers.

Functions Explained

According to the speaker, active magnesium oxide usually functions as an acid acceptor and as a vulcanizing agent. These functions account for the majority of uses of active magnesium oxide in rubber. Mr. Sheets explained that in some cases, active magnesium oxide has a dual role, serving first as a retarder and then as a curative. He added that magnesium oxide can also serve as a moderator of the curative system or as an ultraviolet screening agent.

Mr. Sheets informed the group that the magnesium oxide properties which are of most importance to the rubber compounder are: ignition loss, impurities, particle size, and surface activity as defined by iodine absorption. He stated that surface activity is a good index for predicting magnesium oxide performance in some compounds, but performance is not always a function of surface activity. In some systems, he said, performance of magnesium oxide can be affected by the type and amount of curatives, fillers, and other compounding ingredients. In these cases, it is necessary to evaluate two or more magnesium oxides of different characteristics.

Representatives of major United States firms at the office of the Chase International Investment Corp. for final negotiations on financing a portion of the $72 million Argentine petrochemical complex, Petroquimica Argentina, S.A. Standing(left to right), John G. McLean, financial vice-president, Continental Oil Co.; David Rockefeller, president, Chase Manhattan Bank; Robert L. Garner, president, International Finance Corp.; Victor E. Rockhill, president, Chase International Investment Corp.; and Andre Meyer, senior partner, Lazard Freres & Co. Seated (left to right), Harold G. Osborn, board chairman, Petroquimica Argentina, S.A.; Robert I. Wishnick, board chairman, Witco Chemical Co., Inc.; Leonard F. McCollum, president, Continental Oil Co.; George R. Vila, president, U. S. Rubber Co.; and Richard D. Ricketts, president, Fish International Corp.

Finance Argentine Rubber Complex

► Financing arrangements have been completed for an important portion of a $72 million petrochemical complex to be built in Argentina to supply that country's major needs for synthetic rubber, benzene, and chemical intermediates, which are now largely imported. The complex, known as Petroquimica Argentina, S.A., (PASA) is expected to involve the largest investment of private capital ever made in a new South American industrial project. A purchase agreement covering $18.5 million of five to ten year Class B subordinated debentures of PASA, was signed on October 11 at the offices of the Chase International Investment Corp., New York, N. Y.

Five Sponsoring Firms

Five United States firms are sponsoring the project and will initially own all the stock in PASA. They are the U. S. Rubber Co., Witco Chemical Co., Continental Oil Co., Cities Service Co., and Fish International Corp. The sponsoring companies intend to offer a portion of the common stock of PASA to Argentine investors and create a market for it as soon after the completion of construction and the establishment of profitable operations as it is feasible.

The PASA plant is to be built at San Lorenzo, about 230 miles up the Parana River from Buenos Aires, and will establish a modern, efficient petrochemical industry in Argentina. According to the sponsors, the net savings in foreign exchange to Argentina are expected to amount to about $29 million a year.

Production Units

The complex is to include a catalytic reformer and units to make butadiene, styrene, benzene, aviation-grade alkylate, SBR rubber, *cis*-polybutadiene, and intermediate products including carbon black. The sponsoring firms will provide the initial management staff for PASA, and that company will subsequently train the Argentineans for supervisory and operating positions.

The proposed capitalization of PASA will consist of $18.5 million cash investment in preferred and common stock by the five sponsors, $30 million in five to seven year Class A debentures to be issued for the purchase of machinery and equipment, the $18.5 million Class B subordinated debentures for which agreements were signed, plus short-term working capital loans of about $5 million to be made by the sponsors.

Placement of the Class B debentures was arranged by Chase International and Lazard Freres & Co., each of whom also agreed to acquire debentures for its own account, and a substantial investment in the debentures is to be made by the International Finance Corp. of Washington, D. C.

Rubber Industry Construction and Expansion

The editors of RUBBER AGE feel that the continuing growth and expansion of the rubber industry is of interest and importance to those associated with the industry. Each issue of RUBBER AGE contains news items on expansion activities of both rubber manufacturers and suppliers. Periodically, we will summarize the growth of the rubber industry in terms of new plant construction and additions to existing facilities. The last summary appeared in the June, 1961, issue. The following companies have announced expansion plans or construction completions as of July 1, 1961.

Rubber Goods Manufacturers

Company	Location	Products	Remarks
Acme-Hamilton Mfg. Corp.	Trenton, N. J.	Mechanical goods	400,000 square foot plant consolidating two separate plants; Completion scheduled for December, 1961.
Batesville Rubber Co.	Batesville, Ark.	Heels, soles, and tire retreading materials	Cost: $1.4 million; Over 600 items being produced.
Bristol Mfg. Corp.	Bristol, R. I.	Fabric and waterproof footwear	15,475 square foot addition to existing plant.
Davidson Rubber Co.	Dover, N. H.	Urethane foam products	100,000 square foot facility.
Dayco Corp.	Springfield, Mo.	V-belts	52,800 square foot addition to its Springday Div.; Part of a $1 million expansion program.
Dayco Corp.	Waynesville, N. C.	Foam latex, V-belts, automotive hose, and urethanes	60,000 square foot warehouse which can be converted into a manufacturing facility.
Firestone Tire & Rubber Co.	Bethune, France	Tire and tubes	Using Diene synthetic rubber from firm's Port Jerome unit.
General Tire & Rubber Co.	Montebello, Calif.	Urethane foam	48,000 square foot facility; Later to be enlarged to 100.000 square feet.
B. F. Goodrich Co.	Akron, Ohio	Airplane and off-the-highway tires	$2 million expansion and modernization of facilities; Completion by end of 1961.
Karman Rubber Co.	Akron, Ohio	Molded rubber goods	5,000 square foot addition is part of program to double floor space by 1962.
Kelly-Springfield Tire Co.	Tyler, Texas	Passenger tires	Capacity: 4,000 tires annually; 200,000 square foot plant scheduled for completion in March, 1962 with full production by last quarter; Cost: $10 million.
U.S. Rubber Co.	Gastonia, N. C.	Vyrene elastic thread	Production facilities doubled.

Suppliers

Australian Carbon Black Pty., Ltd. (United Carbon Co. and Cabot Corp.)	Altona, Australia	Carbon black	$1.2 million expansion doubling annual capacity to 60 million pounds; Completed in October, 1961.
Cary Chemicals, Inc.	East Brunswick, N. J.	Polyvinyl chloride	150 million pound per year unit, part of $14 million expansion program.
Columbian Carbon Co.	Houston, Texas	Carbon black dispersions	Now in production; Capacity: 8 million pounds annually.
Continental Carbon Co. (Witco Chemical Co.)	Bakersfield, Calif.	Carbon black	Capacity: 50 million pounds annually; Cost: $4 million; On stream in Mid-1961.
Copolymer Rubber & Chemical Corp.	Baton Rouge, La.	Butadiene and SBR rubber	Part of $5 million expansion program; On stream in June, 1961.
Firestone Tire & Rubber Co.	Port Jerome, France	Diene rubber and synthetic latex	Capacity: 25 million pounds annually; Completion: Late-1961.
Goodrich-Gulf Chemicals, Inc.	Institute, West Virginia	SBR	Expanding facility to increase capacity by 8 per cent.
Goodyear Tire & Rubber Co.	Akron, Ohio	Synthetic rubber latex	$1.25 million expansion completed in June, 1961; Capacity upped 15 per cent.
Goodyear Tire & Rubber Co.	Houston, Texas	Specialty synthetic rubbers	$1.3 million stainless steel finishing line added to unit; Capacity of line: 16,000 long tons annually; Plant capacity: 245,000 long tons.
Polymer Corp., Ltd.	Sarnia, Canada	Butadiene	$1.5 million butadiene extraction unit. Completion: Fall, 1961.
Polymer Corp., Ltd.	Sarnia, Canada	Polybutadiene	Capacity: 20,000 tons per year; Can also produce polyisoprene; Completion: Late-1962.
Sid Richardson Carbon Co.	Big Spring, Texas	Carbon black	Capacity: 50 million pounds annually; On stream in Mid-1961.
United Carbon France, S.A.	Port Jerome, France	Carbon black	Capacity: 50 million pounds annually; Cost: $5 million; On stream in Mid-1961.
U.S. Rubber Co.	Winnsboro, S. C.	Nylon tire fabric	Cost $1.5 million; Completion: December, 1961.

Detroit Hears About Stereo Compounds

► The Detroit Rubber & Plastics Group held its Fall Meeting on October 5, 1961, at the Wolverine Hotel in Detroit, Mich. The technical session included talks by R. S. Hanmer (Phillips Chemical) on "*Cis*-4 Polybutadiene Compounds" and by V. R. Bruns (Shell Chemical) on "Polyisoprene Compounds." After dinner, the members were shown films of the highlights of the Detroit Lions football games in 1960, which were followed by a question and answer session directed by Joe Schmidt, captain of the Detroit Lions.

In his talk on polybutadiene, Mr. Hanmer explained that *cis*-4 has been studied extensively in tread formulations for heavy-duty truck tires over a period of several years. He presented data on the effect of increased oil and black levels in *cis*-4 rubber alone and in blends of *cis*-4 rubber with natural rubber. Mr. Hanmer pointed out that truck tire test results showed that a 60-40 mixture of *cis*-4 rubber and natural rubber, compounded with 60 phr ISAF black and 18 phr highly aromatic oil, gives an average abrasion index improvement of 43 per cent compared to natural rubber with conventional oil and black levels. He added that in limited tests to date a tread containing *cis*-4 rubber alone with 70 phr HAF black and 22 phr highly aromatic oil has shown a 61 per cent advantage over the same control tire.

In discussing the use of *cis*-4 rubber in neutral mechanical goods recipes, Mr. Hanmer explained that substitution of *cis*-4 rubber for a part of the natural rubber or SBR in these recipes results in lower modulus and tensile values, lower tear strength, higher resilience and durometer values, and significant improvement in resistance to low temperature stiffening. Mr. Hanmer also presented data for floor tile stocks and shoe heels to illustrate general trends in properties to be expected when substituting *cis*-4 rubber for other rubbers commonly used in non-tire formulations. According to the speaker, the trends are the same in these compounds as for those in the mechanical goods recipes.

Mr. Bruns, the next speaker, discussed the processing and compounding of polyisoprene rubber. He stated that its excellent mold flow characteristics make it a logical choice in molded goods, and because of its good gum properties, extend this use to include both heavily and lightly loaded stocks. He pointed out that the low ash, soap, and organic acid content contribute to its low water absorption and good electrical properties.

According to Mr. Bruns, the processing techniques required to obtain maximum benefit or properties of polyisoprene rubber are sometimes different from those used with natural rubber. He explained that those techniques that are condusive to giving good dispersion of curatives and fillers are all that are required. This would include such practices as peptizing the polymer before compounding, masterbatching curatives, and the use of low melting point easily dispersed accelerators. He added that while this imposes some changes for the rubber compounder, the benefits to be gained have been shown to be well worth the effort.

Texas-U.S. Dedicates Laboratory

► Completion of a new research and development laboratory at Parsippany, New Jersey, has been announced by the Texas-U. S. Chemical Co. The facility incorporates many of the most modern high polymer research tools available, according to Texus President A. K. O'Keefe, and contains one of the most extensive compounding, processing, and physical testing facilities in the SBR industry. The two-story brick module structure, designed to house a staff of up to 100 persons, comprises over 50,000 square feet of space. It includes administrative offices, and more than 20 separate laboratories for analysis, research, and developmental work, company officials point out.

The new facility will be under the direction of Dr. Bernard C. Barton, director of research and development. In addition to the basic research facilities, the laboratory also contains a complete technical service department. Adjacent to the new building are steam generating and transformer plants and a self-contained waste treatment plant.

Texas-U.S. Chemical Co., one of the primary styrene-butadiene producers, is jointly owned by the Texas Co. and the U.S. Rubber Co. Executive offices and plant are located in Port Neches, Texas.

UCC Silicone Rubber Base

► A new fusible silicone rubber base, specifically designed for fabricating electrical insulating tapes, has been developed by the Silicones Division of Union Carbide Corp., New York, N. Y. Designated Y-3277 base, the new material is said to provide the fabricator with the utmost flexibility in compounding, and, at the same time, offer substantial cost advantages. With the Y-3277 base, UCC supplies a special catalyst masterbatch, YC-3277, which is reported to assure a non-blooming tape, as well as permitting the fabricator to set the catalyst concentration.

According to the company, fusible tapes made from Y-3277 base feature high tack and good surface gloss at any durometer hardness, as well as good physical and electrical properties. In addition, it can be clear, neutral, or colored, and will have excellent uncured strength and high extrusion rates.

SPE Buffalo Technical Meeting Hears Papers on Flexible Foams

► Eight papers on flexible foams were presented as part of the Regional Technical Conference on Plastics Foams, sponsored by the Buffalo Section of the Society of Plastics Engineers, held on October 5, 1961, at the Hotel Lafayette in Buffalo, N. Y. Six papers on rigid foams completed the program.

The first speaker, H. W. Tenney, Jr. (Dow Chemical), in his paper on "Progress in Polyethylene Foam," stated the question which is probably foremost in the mind of any engineer who specializes in foam plastics is whether or not a new plastic can be foamed as many of its predecessors have been. He pointed out that as in the evolution of many older plastics such as phenolics, polystyrene, and cellulose acetate, polyethylene has been foamed and is now taking its place in the family of foam plastics.

Two Different Processes

According to Mr. Tenney, as the result of several separate development groups investigating foamed polyethylene, two different processes exist. He explained that one process produces foamed polyethylene at 2 lbs./cu. ft. density and the other at 20 to 30 lbs./cu. ft. density, both using high pressure polyethylene resin. He stated that these two polyethylene foams, distinctly different in form, methods of fabrication, density, and physical strength properties, have made themselves noticed in the foamed plastics industry.

The next paper, "The Mechanism of Efficient Production of Fine Cells in the Extrusion of Expanded Polymeric Composition," was given by Ralph H. Hansen (Bell Telephone Laboratories). Mr. Hansen stated that expanded polymer, like highly loaded polymeric compositions, are of great interest because of savings which result when a gas or an inexpensive filler is used to replace comparatively high-priced polymer. He pointed out that even more important are the wide variations in products which can be produced and the attractive properties which these products possess.

According to the speaker, in polymers such as polyethylene, cross-linking of the expanded or loaded composition can be used to retain substantial portions of many of the useful physical properties of the polymer itself. For example, he added, highly loaded rubber or polyethylene can contain as much as 75 to 85 per cent of filler and still possess desirable physical properties if the compositions are suitably cross-linked. He remarked that foamed structures in which more than 95 per cent of the polymer has been replaced by a gas can be produced without the necessity of cross-linking. In some instances, he added, it has even been found to be advantageous to expand loaded polymeric compositions.

The next paper, "The Use of Low-Temperature Blowing Agents for Vinyl Synthetic Leather," was co-authored by John H. Hook and John J. Walker (both of DuPont). The authors remarked that since 1941, the use of blowing agents has become increasingly important in expanding plastics. They pointed out that a low decomposition temperature makes the blowing agents ideally suited for producing open-celled vinyl foam. The authors highlighted the product and process adgantages to be obtained from the use of low temperature blowing agents in the production of vinyl foam. They stated that the use of low temperature blowing agents does offer advantages to the producer of vinyl synthetic leather. These advantages lie in the area of improved properties, improved processing, and the opportunity to produce vinyl foam of unusually low density.

Loading With Gas

The next speaker, Robert J. Meyer (Goodrich Chemical), discussed "New Dimensions in Cellular Vinyl Processing." He described a technique of loading vinyl shapes with gas to form a high density cellular product. According to the speaker, the successful practice is related to use of very low levels of blowing agent to form balanced levels of gas within the structure being processed. He explained that the technique is applicable to all current processing methods for vinyl resins.

In his paper on "Formulation of Atmospherically Blown Plastisol Foam," Arnold C. Werner (Naugatuck Chemical) stated that the incorporation of blowing agents into liquid plastisol systems to produce a simultaneously blown and fused product is a long known technique now being utilized most successfully in the production of vinyl foam fabric laminates. He remarked that there are a variety of formulating variables that influence the quality of foam produced as measured by such parameters as foam density and quality. In addition, plasticizer level and type, blowing agent level and decomposition temperature, and most important, resin selection are some considerations that are involved.

According to Mr. Werner, for the present interest seems to center on foam vinyl laminates with relatively high plasticizer levels and medium densities. He explained that these requirements produce no particular difficulty in formulation, however, low plasticizer levels, highly filled compounds, and inadequate oven temperature ranges introduce restrictions that require special attention for successful compounding. He stated that generally these compounds must be designed to have sufficiently low hot melt viscosity properties in the fusion temperature range where the vinyl is now in its molten or plastics state.

Many Applications Found

H. L. Vincent and R. F. Moore (both of Dow Corning) co-authored the next paper, "Room Temperature Expanding Silicone Foams." They pointed out that silicones, recognized for their outstanding resistance to heat, cold, moisture, and oxidation, are particularly suited to many applications where foam structure is desirable. The authors discussed two new types of silicone foam mixtures which foam at room temperatures.

They stated that these new materials are two-component systems that produce either rigid or resilient foams, and they are prepared either by using a high-speed mixer for small batches or a continuous mixer for larger pours. In addition, they can also be sprayed. According to the authors, the greatest asset of these silicone compositions aside from heat stability is their ability to foam in place.

"Foaming Agents for Polyolefins" was the subject discussed by the next speaker, Henry R. Lasman (National Polychemicals). Mr. Lasman remarked that cellular materials based on polyolefin resins can be produced

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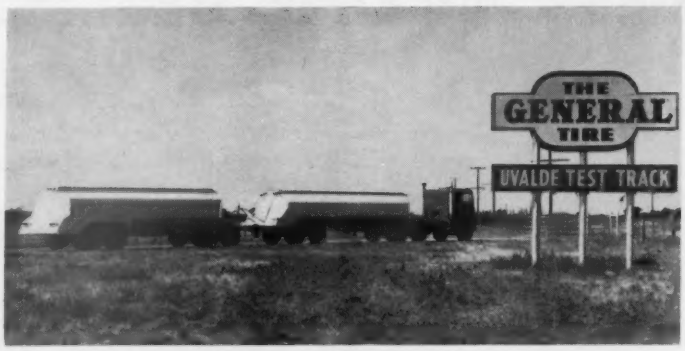
by both physical and chemical methods. In the physical foaming processes, the cells are produced by materials that change their physical state during the foaming operation. In the chemical foaming processes, the expanding gas is liberated during a chemical reaction involving either the polymer or an additive. He stated that in common with other plastics foams, polyolefins can be converted into cellular materials having interconnected or closed cells and a wide range of physical properties. He discussed the agents and the processing methods used to produce this diversity of polyolefin foams.

The final paper, "New Methods of Polyurethane Foam Preparation," was presented by Sigmund Orchon (Carborundum). Mr. Orchon discussed five methods used in the producing of polyurethane foam. One is by the introduction of water into the resin system which results in the formation of a metastable substituted carbamic acid, which is followed by decomposition and the release of carbon dioxide.

Another Method Cited

Another method cited by Mr. Orchon utilizes the dispersion of an organic liquid with a high vapor pressure in the prepolymer, followed by temperature elevation which causes vaporization of the organic liquid and produces a microcellular structure through the resinous body. A third method of forming polyurethane foams is by the thermal decomposition of a compound which will liberate a gas, usually nitrogen. A fourth method, according to the speaker, is based on the so-called frothing system developed by DuPont. In this method a gas or soluble liquid with a low boiling point is retained by pressure. When the mixture is heated and pressure reduced, frothing and curing are the end result.

The fifth method described by Mr. Orchon is based on a carefully formulated mix, with selected surface agents, cell controlling ingredients, and filler in the absence of any blowing as such. He added that the proper selection of the catalyst and temperature are important factors of the process. According to Mr. Orchon, foams made by this method exhibit greater uniformity of hardness and are tougher. In addition, they also have a much higher tensile and tear resistance and better resilience and compression set.



This 85-foot White Freightliner truck-tractor, capable of testing 18 truck tires during a single test run, is the latest addition to the tire testing fleet at the Uvalde, Texas, test track of the General Tire & Rubber Co.

General Adds to Tire Test Fleet

► General Tire & Rubber Co., Akron, Ohio, recently added a White Freightliner truck-tractor to the test fleet at its 8½-mile oval tire test track at Uvalde, Texas. According to the company, the addition actually allows it to double its testing capacity by pulling two instead of one trailer on test runs. The truck-tractor provides test positions for 18 tires. They actually can mount 34 tires on the Freightliner, but General makes a practice of testing truck tires as singles.

The Freightliner actually is so long it is illegal on the Texas highways, the over-all length being 85 feet or the approximate length of an average basketball court. The truck-tractor is equipped with a 430 hp V-8 Cummins Diesel engine, and has a tandem drive axle with an interaxle differential so that the driving torque is distributed equally between the driving wheels. It also has a 12-speed transmission which permits speeds of 75 miles per hour.

Improved Wing-Stay V

► A new highly improved rubber chemical that provides maximum protection against oxidation in dry rubber compounds, rubber latex and rubber foam applications has been developed by the Chemical Division, Goodyear Tire & Rubber Co., Akron, Ohio. Called Wing-Stay V, it is also recommended as a stabilizer for all non-staining styrene and nitrile types of synthetic rubber during their manufacture, the company states. Another feature of the chemical is that once injected into a synthetic rubber, it continues to work as an antioxidant through the various production steps, including drying, and retains its effectiveness in cured end products. At the same time it protects against discoloration by oxides of nitrogen and other products of combustion, the company added. Wing-Stay V is described as an alkylated, styrenated phenolic compound.

Tenneco Unit On Stream

► Tenneco Oil Co., Houston, Texas, has begun operations at its new aromatics production facilities at Chalmette, La. This marks the company's entry into the petrochemical field. Benzene, ethylbenzene, orthoxylene, mixed xylenes, toluene, and heavy aromatic solvents are being produced for use in the manufacture of rubber, plastics, and chemicals. The new facilities include a 6,000-barrel-per-day catalytic reformer, a 2,200-barrel-per-day extraction plant, and fractionation units capable of producing annually 22 million pounds of orthoxylene and 20 million pounds of ethylbenzene.

► Marbon Chemical, Washington, West Va., has extended its services by the appointment of General Public Warehouse Co., Philadelphia, Penna., to handle Eastern warehouse facilities.

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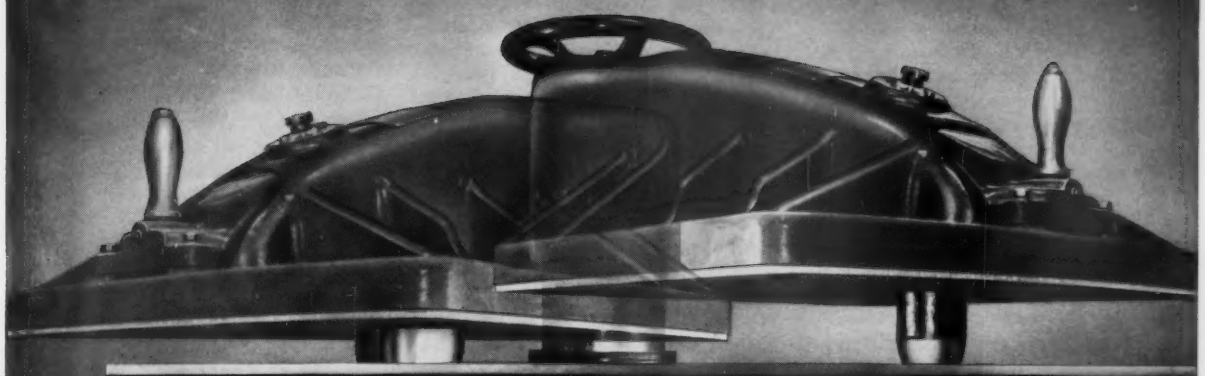

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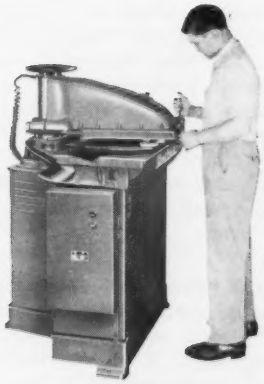

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Names in the News

George J. Coleman, Jr. has been named product manager of Industrial Chemical Sales for the Michigan Chemical Corp., Saint Louis, Mich., and will be based in New York City.

John S. Atwood, formerly manager of the Chemical Department of Koppers Engineering and Construction Division, has been appointed assistant to the vice-president of the Plastics Division of the Koppers Co., Inc., Pittsburgh, Penna.

John T. Whitely, formerly associated with W. R. Grace & Co., has been elected secretary-treasurer of the Amerace Corp., New York, N. Y. **H. Nelson Flanders, Jr.,** previously secretary-treasurer, becomes controller.

Howard R. Cushman, branch manager of the New York City office of the Foxboro Co., Foxboro, Mass., has also been named regional sales manager for the New York territory. He succeeds **John E. Hewson,** who has been appointed field manager of the Systems Engineering Division.

H. E. Hughes, manager of the polyisoprene rubber plant of the Shell Chemical Co., now under construction near Marietta, Ohio, has been named manufacturing manager of the Synthetic Rubber Division, replacing **R. L. Kittle.** Mr. Hughes is succeeded by **G. A. White,** superintendent of operations for the Marietta plant.

Carl Smith, formerly assistant general manager of the Wyandotte Chemicals Corp., Wyandotte, Mich., has been elected vice-president of industrial chemicals marketing.

R. K. Turner, formerly president of the Union Carbide Plastics Co., New York, N. Y., has been elected a vice-president of Union Carbide Corp. He is succeeded by **William B. Humes,** formerly vice-president of Union Carbide Plastics Co.

Arnold E. Boedeker, director of art and exhibits for the Goodyear Tire & Rubber Co., Akron, Ohio, has retired after more than 45 years' service with the company.

Samuel Resnic, mayor of Holyoke, Mass., has been elected a director of the Acme-Hamilton Manufacturing Corp., New York, N. Y.

Harry J. Ulkloss, Jr., formerly assistant treasurer of the Provident Tradesmen's Bank & Trust Co., has been elected treasurer of the Electric Storage Battery Co., Philadelphia, Penna., succeeding **D. N. Smith** who has resigned.

Kenneth L. Campbell, Jr., formerly manager of truck and off-the-highway tire engineering, has been appointed western division manager of manufacturers sales for the Firestone Tire & Rubber Co., Akron, Ohio. He succeeds **E. R. Horch,** who has been named Akron district sales manager.

Clayton F. English, executive vice-president and treasurer of Sturtevant Mill Co., Dorchester, Mass., has been elected chairman of the board, succeeding **William T. Doyle,** who has retired after 57 years with the company.

D. O. Grimm, office manager of the O'Sullivan Rubber Corp., Winchester, Va., has been elected treasurer of its subsidiary, Gulfstream Plastics, Inc., Hialeah, Fla., succeeding the late **Frank Mueller.**

James W. L. Monkman, formerly director of sales for the Synthetics Department of the Hercules Powder Co., Wilmington, Del., has been named to the newly-created post of director of sales of plastics in the Polymers Department.

John B. Cornwell, Jr., formerly plant manager of Reeves Plastics, Inc., Fairmont, N. C., has been named director of technical sales service for the company's Fiber Division in Spartanburg, S. C. **Robert M. Hicklin,** formerly plant manager of the company's Osage works at Bessemer City, N. C., has been appointed production manager of the Fiber Division.

Carl St. Onge, formerly parts manager for Scott Testers, Inc., Providence, R. I., has been named orders manager for the firm.

Thomas G. Hirschinger, formerly associated with Aluminum Co. of America, has joined the Research Department of the Pittsburgh Plate Glass Co., Barberton, Ohio, as research chemist. **William R. Harris,** formerly operations superintendent, has been named assistant works manager of the company's Chemical Division, succeeding **Robert Widing,** who has been transferred to the Pittsburgh, Penna. office.

Dr. Joseph Gordon has been appointed technical supervisor of the Polymer Research Section of the General Chemical Division of Allied Chemical Corp., New York, N. Y.

Dr. Wang Mo Wong, formerly associated with the United States Rubber Co. as chief chemical engineer at the Joliet Arsenal, has joined the pilot plant research staff of U. S. Borax Research Corp., Boron, Calif., as head of the organic pilot plant.

Antonio T. Chong, formerly group leader in the Technology Department of the U. S. Industrial Chemicals Co., New York, N. Y., has been named assistant production manager for Petrothene resins.

William H. Spratling, formerly assistant director of purchases, has been promoted to director of purchases for the United States Rubber Co., New York, N. Y., succeeding **Stanley W. MacKenzie,** who has retired after 41 years with the company. **William E. Wolstenholme,** a member of the Plastics Research Department, has been appointed a senior research scientist at the company's Research Center in Wayne, N. J.

Dr. William F. Tuley, formerly group leader of rubber chemical and agricultural chemical research and development for Naugatuck Chemical, has been appointed assistant general manager of Naugatuck-Rumianca S.p.A., Turin, Italy. **Dr. Harry D. Glenn,** acting factory manager of the Baton Rouge, La., units of Naugatuck Chemical, has been named factory manager of the two plants.

Donald F. Hutchinson, formerly head of the development and control section of Excelsior Mills, has joined the U. S. Rubber Reclaiming Co., Inc. as chemist at the Vicksburg, Miss., plant.

Foams Discussed at 45th AIChE Meeting

► Latex and urethane foams were the subjects of two papers presented during the 45th National Meeting of the American Institute of Chemical Engineers, held on September 26, 1961, at the Lake Placid Club, Lake Placid, N. Y. The papers were: "The Manufacture and Properties of Latex Foam" by Edward C. Svendsen (U.S. Rubber) and "A Continuous Process for Urethane Foam Prepolymer" by J. R. Wall (Inland Mfg. Div., GMC). According to Mr. Svendsen, the attribute of breathability is one of the important factors accounting for the popularity of latex foam rubber. He explained that the structure is characterized by interconnecting cells which permit passage of air upon flexing. This, he remarked, refutes the contention that rubber in contact with the body is hot.

Mr. Svendsen explained that the original Dunlop process for making latex foam has satisfied the demands made on the major part of the latex industry, but a more recent process has become an important alternate procedure adopted by several companies. It is known as the freeze gel or Talalay Process.

The speaker pointed out that natural rubber latex for many years was the only latex available, but of recent years a synthetic latex has been developed. He added that in spite of significant developments with the synthetic latex, the natural material still makes up more than one third of the total amount consumed. The cost of natural rubber has been the determining factor in its loss of market, Mr. Svendsen said.

In his discussion on urethane foam, Mr. Wall stated that this comparative johnny-come-lately material is making rapid headway in the automobile world. He told the chemical engineers that urethane foam was first used by the automobile industry approximately four years ago and since that time has made great strides, particularly for use in automobile seats. According to Mr. Wall, use of this material grew from 10,300,000 pounds in 1959 to 16,100,000 pounds this year, a gain of 56 per cent, and another advance to 19,500,000 pounds is forecast for 1963.

Urethane foam began to make inroads into the automotive seating field as a substitute for foam rubber, Mr. Wall said, because it was a less expensive material, since it could be produced at much lower densities, with comparable load-bearing properties. Mr. Wall looks for this trend to continue, with urethane foam taking over more volume from cotton and curled hair, as well as from rubber latex. The speaker explained that urethane was first used in the automotive industry in a vinyl-covered instrument panel, but since has been used extensively in seat cushions and to a lesser degree in head liners and arm rests.

Low Density Filler

► A new low-density filler has been developed by Great Lakes Carbon Corp., Los Angeles, Calif., which is said to have the lowest apparent or bulk density of any known mineral filler. Called Dicalik Bulk-aid, it is now used in papermaking, but testing by a number of producers of other products indicates probable early use in many other applications, such as a non-structural filler in foam rubber and other rubber goods, a non-structural plastic filler and extender, and as a filler in gaskets.

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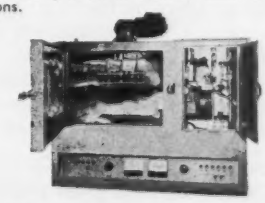

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John C. Fogarty

Quantum Sales Manager

► John C. Fogarty has been named sales manager of Quantum, Inc., Wallingford, Conn. In his new position, Mr. Fogarty will have charge of the planning of research projects to fit the technical needs of Quantum's industrial clients; the negotiation of research contracts; and the licensing of patents to products and processes held by the laboratory. Mr. Fogarty, who is a graduate of the U. S. Military Academy, was formerly a sales representative for the Warner-Chilcott Laboratories, and manager of the International Chromium Plating Co.

Silicone Base Compound

► A silicone rubber base compound, which combines low temperature flexibility with good resistance to oils and other fluids has been developed by the Silicones Division, Union Carbide Corp., New York, N. Y. Designated KW-1920, the new base can be compounded into silicone rubber stocks for making seals, diaphragms, gaskets, and other vital parts for military aircraft and missiles where the combination of oil resistance and low temperature flexibility is required, the company states. Silicone rubber compounds fabricated from KW-1920 base feature useful temperature range of —120 to +450° F.; volume swell in fluids equivalent to that of dimethyl silicone rubber compounds; pre-conditioning for easy processing; and low shrinkage. At the same time the company announced a change in the designation of its silicone rubber base compound Y-3131, to KW-1330. KW-1330 is widely used on electrical wire and cables for automobiles, aircraft and military vehicles.

Columbian Unit on Stream

► A highly automated carbon black dispersion plant of the Columbian Carbon Co., New York, N. Y., has gone on stream in the ship canal area of Houston, Texas. The facility, with a capacity of approximately eight million pounds of concentrate a year, is designed for the production of dispersions of carbon black in both low density and high density polyethylene, as well as polypropylenes. According to the company, blends can be made in amounts up to 30,000 pounds. Sampling for quality control purposes has been automated so that a continuous check may be maintained on the quality of dispersions being manufactured, as well as their moisture content. The plant can produce both pipe concentrates and cable grades of concentrate to Bell Laboratory specifications. The new unit is managed by Robert L. Turpen, who has had extensive experience in the compounding of rubber and plastic materials.

Contract Awards

► General Tire & Rubber Co., Akron, Ohio, has been awarded a $4,785,000 government contract for gas masks. The order, for M-17 Service Gas Masks, is the fourth, and largest, received by the company in 1961, and boosts the total mask orders to $6,380,000. The previous orders were for lightweight oxygen masks for the U. S. Air Force, M14A1 Tank Gas Masks for the Chemical Corps, and for Civilian Defense masks.

► Contracts totaling $2,245,997 have been awarded to the B. F. Goodrich Aerospace and Defense Products Division of B. F. Goodrich Co., Akron, Ohio, by the U. S. Navy and Air Force. The orders are for Sidewinder rocket motors, aircraft tires, and de-icers and glare shields for fighter aircraft.

► Firestone Tire & Rubber Co., Akron, Ohio, has been given a $700,000 order from the U. S. Air Force for aircraft tires. The tires are for F-105 jet aircraft employed by the Tactical Air Command at bases throughout the world.

Martin H. Schneider

Promoted by Marbon

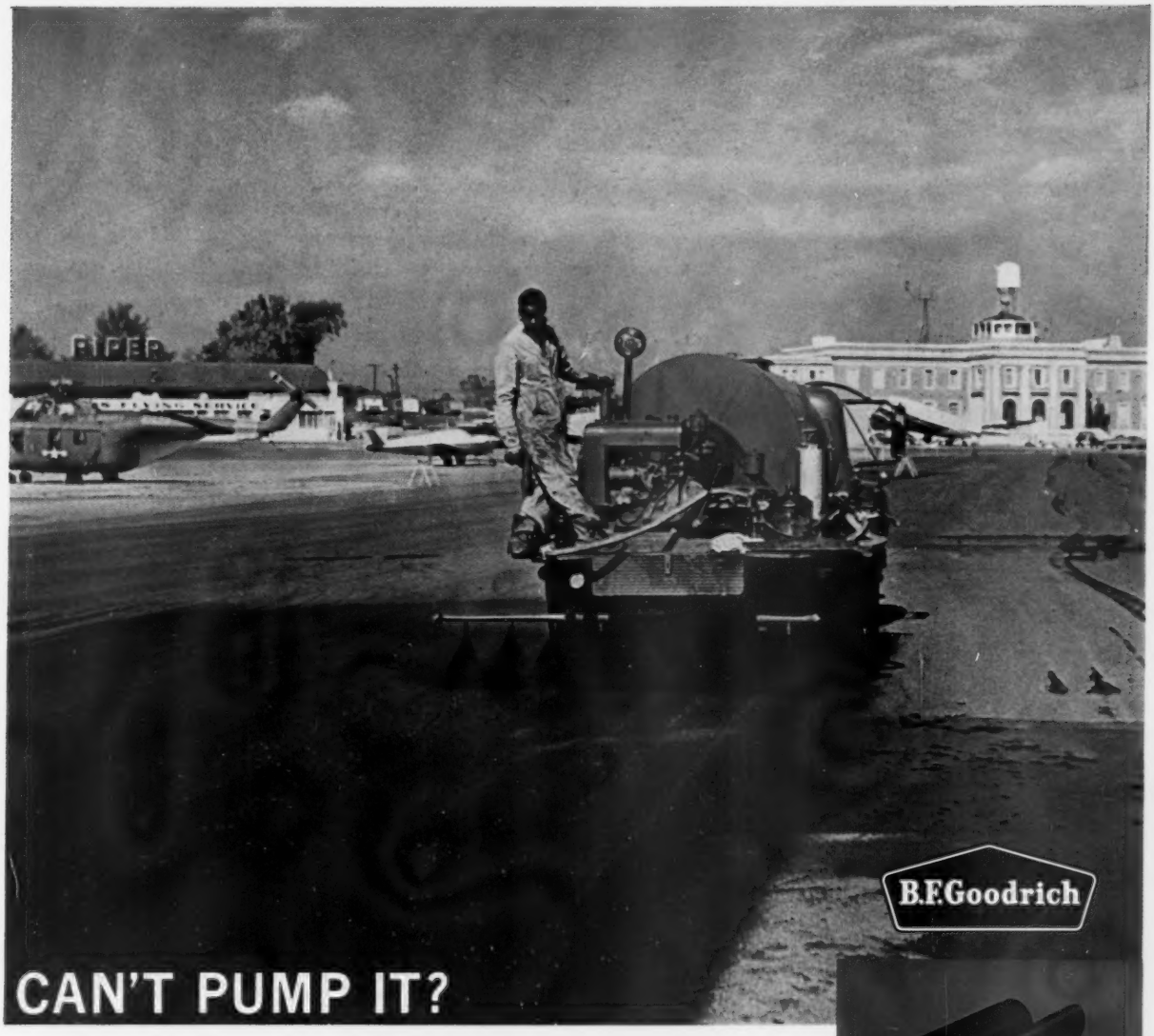
► Marbon Chemical Division of Borg-Warner Corp., Washington, West Va., has named Martin H. Schneider as technical sales representative for a 21 central state area with headquarters in Chicago, Ill. Prior to his new position, Mr. Schneider was a sales assistant at Marbon's Woodmar plant in Parkersburg, West Va. Mr. Schneider is a graduate of the University of Pittsburgh, and had been associated with the Ryerson Steel Co. and the Gulf Oil Corp.

Firestone to Aid Japan

► Firestone Tire & Rubber Co., Akron, Ohio, will produce tires in Osaka, Japan, in cooperation with the Ohtsu Rubber Industry Co., Ltd. The agreement, signed by the two companies gives Firestone its fourth facility for the production of tires and tubes in the South Pacific and Eastern Hemisphere. Other plants are located at Bombay, India, Christchurch, New Zealand, and Manila, The Philippines. Under the agreement, Firestone will provide technical information and assistance and share its knowledge of new developments with Ohtsu.

Joins United Carbon

► Fred Barlow, formerly with the Thermatomic Carbon Co., has joined the United Carbon Service Laboratory, Akron, Ohio as supervisor. Mr. Barlow will be responsible for planning, programming, directing and reporting technical service projects conducted for customers at the laboratory. Mr. Barlow began his career in 1943 as development engineer for Dominion Rubber Co.



CAN'T PUMP IT?

even coal tar pitch emulsion sand slurry can be pumped with HYCAR impellers

This special surface treatment for asphalt lengthens pavement life, is fuel resistant—even lets asphalt take the punishment of landing airplanes without complaint. There was only one difficulty: the mixture was extremely tough on pumps. Then the manufacturer tried impellers made of Hycar nitrile rubber. **Result:** pumps now last five times longer, make application to pavements far more economical and open the road to extra satisfaction for a lot of asphalt customers.

The dressing really presents problems: loaded with abrasive sand, it wears and attacks ordinary rubber rapidly. Hycar provides long life, and it maintains the desired degree of resilience. Hycar oil- and abrasion-resistant rubber may be the practical answer to your product problem.

For more information on the use and properties of Hycar, write Department MD-8, B.F.Goodrich Chemical Company, 3135 Euclid Ave., Cleveland 15, Ohio. In Canada: Kitchener, Ontario.

Jennite J-16 is the name of the coal tar pitch emulsion and is manufactured by Maintenance, Inc., Wooster, Ohio. It is being pumped successfully using impellers of Hycar molded by Oil States Rubber Company, Arlington, Texas, for pump manufacturer, Bowie Machine Works, Bowie, Texas. B.F.Goodrich Chemical Company supplies the Hycar nitrile rubber.

B.F.Goodrich Chemical

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Hycar

Rubber and Latex

Hycar

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Rubber

HYCAR 1001, 1041, 1051. High acrylonitrile content, best oil and fuel resistance. Uses: High strength adhesives, fuel hose, oil well parts, fuel cell liners, and other uses requiring resistance to aromatic fuels, oils and solvents. Hycar 1051 provides superior processing characteristics.

HYCAR 1411. Special finely divided powder type nitrile rubber. Developed primarily for use in modification of phenolic and vinyl resins. May be used in applications where physical state is important.

HYCAR 1002, 1042, 1052. Medium high acrylonitrile content. Uses: Shoe soles, kitchen mats, printing rolls, and other applications requiring good oil resistance. Hycar 1002 provides best water resistance of all nitrile rubbers. Hycar 1052 provides excellent processing characteristics. May be used for a vinyl resin modification and in blends with SBR for intermediate oil resistance.

HYCAR 1312. Liquid nitrile polymer of the medium acrylonitrile type. A non-extractable, non-migrating, non-volatile plasticizer. Uses: As a plasticizer for rubber compounds where improved flow and knitting are required. As a plasticizer in the preparation of plastisols. Can be cured to a hard rubber state.

HYCAR 1432. A low-temperature-polymerized, directly soluble polymer in crumb form. Adhesives and solvent solutions, where the crumb form and direct solubility are an excellent aid in handling and processing.

HYCAR 1072. Excellent compatibility with vinyl and phenolic resins. Provides improved low temperature resistance to brittleness, good hot tear and outstanding abrasion resistance.

HYCAR 1043, 1053. Medium acrylonitrile content for applications requiring improved low temperature properties. Hycar 1053 provides improved processing characteristics—excellent for extrusion.

HYCAR 1014. Low acrylonitrile content for special military requirements. Excellent low-temperature flexibility is obtained with a sacrifice in oil and solvent resistance.

HYCAR 4021 (PA-21). Polyacrylic acid ester copolymer. Developed for service requiring outstanding resistance to high temperature oil and air service. Uses: Air and hot oil applications at temperatures above 300°F. Ozone, light and flex-resistant applications.

HYCAR 2252. Brominated butyl polymer. In addition to typical butyl properties it cures faster, requires less acceleration, and is compatible with other rubber. Hycar 2252 can be bonded to metals and other rubbers—has ability to cure when blended or in contact with other rubbers.

GOOD-RITE PRODUCTS

GOOD-RITE 2007, 2057. Good-rite 2007 (Good-rite Resin 50) reinforcing agent and processing aid for use with SBR and other rubbers. Developed for shoe sole manufacturers, but also used in other highly loaded or low-gravity hard compounds requiring toughness, high abrasion and excellent flex life. Good-rite 2057—a masterbatch of equal parts SBR and Good-rite 2007.

GOOD-RITE VULTROL. Prevents scorching of SBR and crude rubber stocks, with no sacrifice of rate of cure.

• For further information, write Dept. FQ-1, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. In Canada: Kitchener, Ontario.

B.F.Goodrich Chemical

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B.F.Goodrich

Dow Fluorosilicones

► A new line of heat, cold, and oxidation resistant materials, called fluorosilicones, has been developed by the Dow Corning Corp., Midland, Mich. In addition to these new materials—fluorosilicone fluids, greases, and compounds—Dow Corning also is marketing a fluorosilicone rubber under the brand name Silastic LS, the LS signifying low swell. High performance, rubberlike fluorosilicone sealants that cure at room temperature have also been developed for specialized aerospace applications.

The company states that while exhibiting many of the useful properties that characterize their silicone cousins, these new semi-inorganic fluids, greases, and compounds feature exceptional resistance to solvents, fuels, and chemicals. It is this outstanding solvent resistance that the company believes will help the fluorosilicones gain the same rapid acceptance and demand accorded silicones in the last decade.

The fluorosilicone fluids are said to offer advantages as plasticizers for rubbers and plastics when solvent resistance and lubricity are features desired for the plasticizer. The fluorosilicone compounds provide good lubricity, are resistant to solvents, oils, and many chemicals, and remain serviceable at low temperatures. According to the company, these grease-like compounds have proved effective lubricants for rubber O-rings, grommets, and amounts in contact with fuels, solvents, or oils. The fluorosilicone greases are said to be unique in that they provide both solvent resistance and good low temperature characteristics.

Nitrile Masterbatches

► Nitrile rubber masterbatches, based on Hycar nitrile rubber supplied by the B. F. Goodrich Chemical Co., are being stocked in standard formulations by Burton Rubber Processing, Inc., Burton, Ohio. The masterbatches contain dioctyl phthalate plasticizers and HAF, SRF, or MT carbon black. They are supplied in slab form and are available steel-strapped to wooden pallets. When the recommended curing agents are added to these masterbatches, the resulting compounds are said to meet various SB specifications for automotive applications. They can also be blended to meet other requirements, the company states.

John M. Bierer (center), former president of the Boston Woven Hose Co., is presented with a plaque, commemorating his 50 years of contributions to the rubber industry, by Maurice J. Bernstein (left), president of the American Biltrite Rubber Co., and James N. Mason (right), president of Biltrite's Boston Woven Hose Division.

American Biltrite Honors Bierer

► John M. Bierer, former president of the Boston Woven Hose & Rubber Co., was tendered a testimonial dinner on October 5 at the Harvard Faculty Club, Cambridge, Mass., in recognition of his 50 years of service to the rubber industry. Mr. Bierer was presented with a plaque by Maurice J. Bernstein, president of the American Biltrite Co. of which Boston Woven Hose is now a division. Participating in the presentation was James N. Mason, president of the division. Mr. Bierer was also presented with a walking stick as a reminder of the days when he would supervise plant operations "with stick in hand."

Present at the dinner were approximately 50 friends and associates. Brief remarks were made by Mr. Bernstein, Mr. Mason and by Salvatore Camelio of the United Rubber Workers of America, F. L. Dawes (Adamson United), Richard J. Marcus (American Biltrite), Ross Ormsby (RMA), and William Rand (Monsanto).

Born on March 3, 1888, Mr. Bierer received his degree in civil engineering in 1908 from Washington and Lee University and a degree in chemical engineering in 1910 from the Massachusetts Institute of Technology. He served as an instructor at MIT in 1910 and 1911 in which year he joined Boston Woven Hose as a chemist. Through the years, his positions of responsibility increased and in 1951 he was elected president. He retired in 1959, but continues to serve as a consultant.

Mr. Bierer is a past-chairman of the ACS Division of Rubber Chemistry and was co-founder and first chairman of the Boston Rubber Group. A Fellow of the India Rubber Institute of England, Mr. Bierer has more than 30 patents to his credit and has contributed many articles to the literature. He is well-known to all in the rubber industry as the co-inventor of the Bierer-Davis Oxygen Bomb.

Production Goes On

► Latex production of the Rubber Latex Co. of America, Passaic, N. J. has not been affected by the explosion that hit the firm's Clifton, N. J., plant recently. Plant operations at Clifton are on a restricted basis, but in no way hinder the production operations of the company, a spokesman for the firm stated. The blast, reportedly caused by an explosion in the firm's 2,000 gallon mixer, blew out two walls and the roof of the brick building. The building housed the mixing machine, barrels of rubber cement, natural and synthetic rubber, resins and pigments.

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TAILOR-MADE REPORTS. The table of contents shown above is typical of the survey of selected plant locations that we will prepare for your organization. Simply send your specific requirements on your business letterhead to Commissioner Keith S. McHugh, New York State Department of Commerce, Room 4717 112 State Street, Albany 7, N. Y.

Keith S. McHugh

Keith S. McHugh, Commissioner
New York State Department of Commerce

Edward J. Amann

Named Chief Chemist

► Edward J. Amann has been named chief chemist of the Ohio Rubber Co., Willoughby, Ohio. Mr. Amann, a graduate of Fenn College (Cleveland) with a B.S. degree in chemical engineering, joined Ohio Rubber in 1934 as a laboratory chemist. He also worked as a compounder in the development laboratory prior to being named assistant chief chemist in 1952. Mr. Amann is a member of the Division of Rubber Chemistry of the American Chemical Society, and of the Akron Rubber Group.

AAA Tries Rubber Posts

► Flexible rubber posts, patterned after big dock fenders, are being tried out as a new means of preventing traffic accidents, the American Automobile Association reports. A seven-year installation at Cuyahoga Falls, Ohio, is said to have had excellent results, according to AAA. There steel guard posts guarding the start of a median strip were replaced by the flexible rubber posts. Each post consists of a five-foot high rubber cylinder mounted on an 18-inch steel core imbedded in concrete. In place of the five or so accidents at this particular danger point, accidents have dropped to one, and in that one accident there was no personal injury and only minor vehicle damage, the auto organization stated. On impact, each post becomes increasingly resistant to flexing, resulting in a braking action much like the stretching of a rubber band. Because of the success of the test installation, the manufacturer, Goodyear Tire & Rubber Co., is planning more scientific tests of flexible rubber posts.

New Polyurethane

► A molding material which can be cured in three minutes, three to five times faster than any other gum polyurethane now marketed, has been developed by Naugatuck Chemical Division, U.S. Rubber Co., Naugatuck, Conn. Because full physical properties can be obtained during this superfast cure, the new material, Vibrathane 5004, will enable molders of polyurethane to reduce cure times and raise the output of production equipment. Standard rubber fabricating machinery is used in processing the new elastomer. The material has excellent processing characteristics and these properties are not sacrificed when it is cured at 350° F. for three minutes, the company states.

Cured products based on the elastomer have high abrasion and tear resistance, good stress-strain properties, high resistance to dry heat aging, good low temperature performance and excellent resistance to ozone, oxygen, fuels, oils and chemicals. Suggested product applications for the new material include automotive parts, conveyor belt covers, hose, cable jackets, molded industrial tires, oil well supplies, diaphragms, seals and gaskets. Polyurethane production facilities at the chemical division's plant in Naugatuck were recently enlarged to permit expanded production of the new elastomer.

Installs Automatic System

► Armstrong Rubber Co., West Haven, Conn., will install automatic process control units in its West Haven and its Natchez, Miss., and Hanford, Calif., tire plants. The automatic control system, furnished by Tracerlab, Inc., Waltham, Mass., is said to be one of the most advanced ever utilized in the production of tire fabric. By controlling all calendering functions in the application of rubber to the tire cord, the new equipment is designed to assure uniformity and to hold quality within tolerances heretofore unobtainable in the manufacture of tire fabric. According to Tracerlab, the installation will also result in the achievement of completely automatic process control in all calender control functions, including automatic control of cross axis.

► R. D. Wood Co., in a move to consolidate all company activities in one location, has moved its general offices from Philadelphia, Penna., to its plant site at Florence, N. J.

Salesmen Hear Sarbach

► Don Sarbach, director of product development for Goodrich-Gulf Chemicals, Inc., Cleveland, Ohio, gave a talk on "Stereospecific Rubbers" at a meeting of the Akron Rubber Chemical Salesmen's Association, held on September 22, 1961, at Nick Yanko's, Akron, Ohio. His comments were that more rapid progress has been made in the field of stereo specific rubbers than the time spent in developing the SBR's. In addition, the new synthetic rubbers possess better properties than SBR and are nearly equal in all respect to that of natural rubber.

Mr. Sarbach was of the opinion that the higher *cis*-4 content of polybutadiene the more it will equal in processing and physical properties to that of natural rubber. As for the isoprene type polymer, he remarked that they have been developed to be exact duplicates of natural rubber. However, due to the cost of the monomer used in the production of isoprene rubber it does not offer the economic advantage as does polybutadiene rubber — and they are nearly equal in properties to that of isoprene rubbers. He stated that compounding for these rubbers is the same as for SBR.

Doubling Black Output

► A $1.2 million expansion program to double carbon black capacity in Australia has been completed by Australian Carbon Black (Pty.) Ltd., a joint venture of United Carbon Co., Houston, Texas and Cabot Corp., Boston, Mass. The plant, located at Altona, Victoria, Australia, produces SRF, GPF, FEF, HAF and ISAF carbon blacks. The expansion boosts capacity to 60-million pounds per year which is double the amount produced previously. Additions included a second furnace unit, new collection equipment and two new 55,000-barrel tanks, providing additional storage for oil feedstocks.

Victor Promotes Gates

► Ralph P. Gates has been director of technical service of Victor Chemical Works Division, Stauffer Chemical Co., Chicago, Ill. Mr. Gates joined Victor in 1949 and was appointed director of special products in August, 1960. He was named administrative assistant in November, 1960. Mr. Gates holds a B.S. degree in chemical engineering from Vanderbilt University and a Masters degree from M.I.T.

Ronald H. Miller

Promoted By Columbian

► Columbian Carbon Co., New York, N. Y., has named Ronald H. Miller as assistant to the general sales manager, C. O. Davidson. Mr. Miller received a B.A. degree in chemistry from Wooster College in 1960 and joined Columbian Carbon in July of that year. Except for six months' service with the U. S. Army, he has been on an extensive training program at the firm's plants and laboratories.

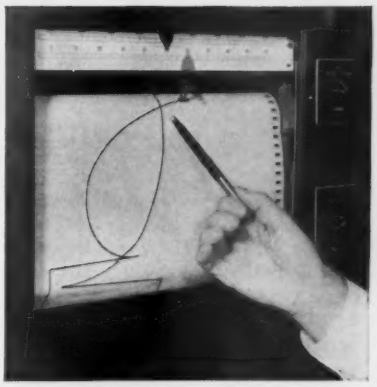
Nuodex Offers Stearates

► Nuodex Products Division, Heyden Newport Chemical Corp., Elizabeth, N. J., has developed a new line of "micronized" calcium and zinc stearates. A newly developed process, exclusive with Nuodex, produces stearates to an average particle size of 3-5 microns. Since stearates are employed chiefly because of their physical rather than chemical characteristics, this offers sizable advantages, the company states. Nuodex is offering "micronized" stearates in two different grades of calcium and two grades of zinc, calcium precipitated or densified and zinc USP or technical.

FMC Building Plant

► FMC Corp., New York, N. Y. will build a multi-million dollar plant to produce toluene diisocyanate, a major component of polyurethane elastomers, at Charleston, West Va. The site, purchased by FMC from the United States government, adjoins the company's large chlorine-caustic plant which will provide a substantial portion of the raw materials needed for producing the new chemical. Initial operation is scheduled for late 1963.

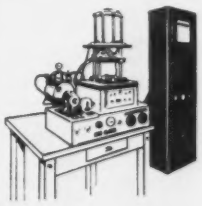
Here's where the rubber compounder avoids the "scrap trap"



MORE AND MORE rubber compounders rely on Scott Mooney Viscometer test data to insure full product quality and full productivity from their presses and extruders. The "sure test" shows three ways to save money:

1. The Scott test (minimum viscosity) indicates that the finished product will meet physical standards — tensile strength, resilience, tear resistance, fatigue life. This cuts rejects . . . builds customer confidence, too.

2. The Scott test (scorch time) assures against scorching . . . yet avoids the equally costly mistake of building too much press time into the compound. This cuts scrap on the one hand . . . cuts waste on the other.



3. The Scott test (cure rate) assures that all products obtain optimum cure in the established cure time cycle. This prevents scrap . . . makes for better customer relations.

If your scrap rate is running high, or you're having trouble meeting industry standards, check your tester needs with Scott. For complete information on Mooney Viscometers, write SCOTT TESTERS, INC., 85 Blackstone Street, Providence, Rhode Island.

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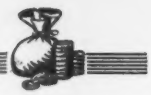
Financial News



Firestone

► Nine months ended July 31: Earnings came to $44,808,343, equal to $1.66 per share, compared with $46,096,273, or $1.70 per share, for the corresponding period in 1960. Sales amounted to $851,605,368, against $883,639,399 for the same fiscal period a year earlier.

Dow Chemical

► Year ended May 31: Net earnings came to $64,439,878, equal to $2.23 per share, compared with $82,404,342, or $3.01 per share, for the comparable period ended 1960. Net sales came to $817,514,653, against $781,433,740 for the same fiscal period a year earlier.

Electric Storage Battery

► First half: Net income amounted to $2,404,000, equal to $1.42 per share, compared with $2,630,000, or $1.56 per share, for the comparable period a year ago. Net sales reached $71,722,000, against $69,860,000 for the first six months of 1960.

Dayco

► Nine Months ended July 31: Net loss of $6,376,572 compared with a 1960 loss of $2,607,830. Net sales in the period amounted to $56,467,827 compared to a 1960 figure of $73,050,089.

Pantasote

► First half: Net income came to $30,455, compared with $74,960 for the first six months of 1960. Sales reached $4,598,538, against $4,572,788 for the corresponding period a year ago.

Raybestos-Manhattan

► First half: Net income was $1,420,941, equal to $2.25 per share, compared with $1,574,711, or $2.50 per share, for the comparable period in 1960.

Anaconda Wire & Cable

► First half: Net income was $299,899, the equivalent of 35c per share, compared with $624,738, equal to 74c per share, for the first half of 1960.

Amerace

► Nine Months ended September 10: Net profits totaled $3,615,579 compared with $1,360,606 in the comparable nine months period of 1960. Earnings per share in the period were $1.84 against a 1960 per share value of 68c. Sales climbed from a 1960 figure of $19,179,976 to $27,621,820 in 1961.

B. F. Goodrich

► Nine Months: Net earnings of $23,077,760, or $2.52 a share compared to $24,121,747, equal to $2.68 a share in the first nine months of 1960. Sales for the nine months amounted to $559,690,620 off 4.8 per cent from the $587,602,200 a year before.

Allied Chemical

► First nine months: Net income $36,011,419, or $1.80 a share, against $41,541,407, or $2.08 a share, in the comparable period of last year. Sales in the first nine months of 1961 were $561,082,650, contrasted with the 1960 figure of $588,590,841.

Lee Rubber

► Nine months ended July 31: Net income came to $31,726, equal to 4c per share, compared with $426,847, or 50c per share, for the same fiscal period a year earlier. Net sales totaled $31,718,056, against $33,016,637 for the comparable period in 1960.

General Foam

► First half: Net income amounted to $139,216, equal to 37c per share, compared with $28,642, or 8c per share, for the first six months of 1960. Net sales came to $5,582,717, against $3,469,828 for the comparable period a year ago.

Goodall Rubber

► First half: Net income was $158,155, equal to 32c per share, compared with $162,609, or 34c per share, for the comparable period in 1960. Sales came to $7,323,647, against $7,373,541 for the first six months of the previous year.

Eagle-Picher

► Nine Months ended August 31: Net income reached $1,780,657, or 86c a share, compared to $3,608,403, or $1.76 a share, for the like period of 1960. Net sales in the nine months totaled $80,170,516 compared with $89,887,541 a year earlier.

Mansfield Tire

► First half: Net income totaled $503,116, equal to 35c per share, compared with $196,043, or 14c per share, for the comparable period a year ago. Sales came to $26,610,715, against $32,549,868 for the first half of 1960.

Nat'l Rubber Machinery

► First half: Net profit amounted to $220,000, equal to $1.03 per share, compared with $111,000, or 53c per share, for the comparable period a year ago. Sales came to $8,790,000, against $12,419,000 for the first six months in 1960.

O'Sullivan Rubber

► First half: Net income amounted to $45,861, equal to 7c per share, compared with $200,964, or 46c per share, for the comparable period a year ago. Net sales totaled $3,576,602, against $4,497,100 for the first half of 1960.

American Biltrite

► First half: Net income was $1,438,151, equal to 92c per share, compared with $1,445,140, or 93c per share, for the first six months of 1960. Net sales reached $42,285,019, against $36,453,372 for the corresponding period a year ago.

Carlisle Corporation

► First half: Net income was $576,503, equal to 48c per share, compared with $668,673, or 56c per share, for the comparable period a year ago. Net sales totaled $12,416,250, against $12,455,815 for the first half of 1960.

Spencer Chemical

► Year ended June 30: Net income reached $6,868,410, equal to $2.31 per share, compared with $6,702,148, or $2.27 per share, for the fiscal year ended 1960. Net sales totaled $79,053,961, against $74,094,050 for the corresponding period a year earlier.

Carl Vill, Jr.

Joins Sales Staff

► Carl Vill, Jr., has been appointed to the sales staff of the Rubber Chemicals Department of American Cyanamid Co., Bound Brook, N. J. In his new post, Mr. Vill will be headquartered in the Akron, Ohio, office of the Rubber Chemicals Department, and will service customers in parts of Ohio, Indiana, Tennessee, and Alabama. Mr. Vill is a graduate of Rensselaer Polytechnic Institute and the Newark College of Engineering with B.S. and M.S. degrees in chemical engineering. He joined Cyanamid in 1953 as a process engineer at the Bound Brook plant, where his diverse experience included more than three years as a departmental engineer for the Rubber Chemicals Manufacturing Department. Since last year he has been assigned to the Rubber Chemicals Sales Department as a technical service representative.

Apex Forms Color Division

► Apex Tire & Rubber Co., Pawtucket, R. I., has established a Color Division which will manufacture and market a diverse line of color concentrates for vinyl processors. Products will include concentrates in pellet, paste, and powder form. Color concentrates which meet standards of the National Electrical Manufacturers Association are available for the wire and cable industry, and standard color concentrates based upon commonly used pigments have been established for the calendering and coating industries. Custom matching and color development services will also be provided. Products of the division will be merchandised through the existing Plastics Division sales staff.

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CURING • CASTING •
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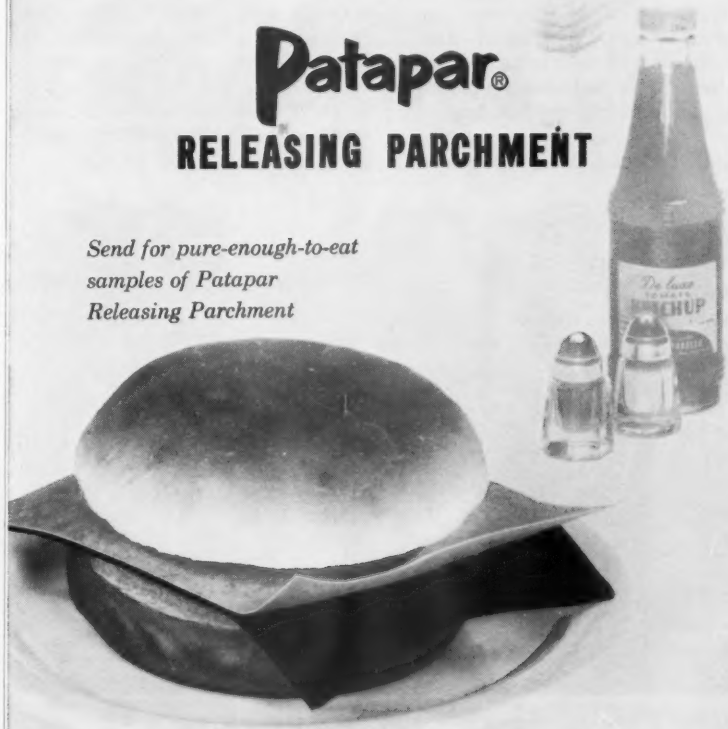

West Coast News

► Featured speaker at the technical session of the Los Angeles Rubber Group, held October 3 at the Biltmore Hotel in Los Angeles, Calif., was Walter T. Blake, vice-president and general manager of Brabender Instruments, Inc., South Hackensack, N. J. Speaking on "Measuring the Processibility of Elastomers Under Typical Processing Conditions," Mr. Blake described how a Plastometer operating on the principle of a recording dynamonmeter was used to gather data on how processibility of elastomers of various types can be determined. Mr. Blake also described the performance and theory of the Brabender instrument and discussed case histories involving elastomer testing. In addition, Mr. Blake presented data showing why other ways of measuring polymers for their processibility are unsatisfactory. Mr. Blake's article will be published in full in a future issue of RUBBER AGE.

The dinner meeting held the night of October 3 featured a talk on "The Psychology of the Rubber Industry," by Dr. Donald Rice, The Rice Institute of Psychiatry, Boston, Mass. Another highlight of the affair was the bestowing of an Honorary Life Membership to Dr. Fernley H. Banbury, inventor of the Banbury Mixer. Mr. Banbury is the thirteenth person to be so honored by the Los Angeles group.

A. H. Federico, Tlargi past-chairman, in paying tribute to Dr. Banbury, stated: "We are privileged to pay tribute to a Tlargi member of long standing, a man renowned in rubber circles the world over for his achievements, his notable service, his high ideals, his integrity and his dedication. He is our good friend and a real gentleman."

In briefly going over the life of Dr. Banbury, Mr. Anderson noted that, "the invention of the Banbury Mixer was first accepted by Goodyear Tire and Rubber Co., and that today there are over 2,500 Banbury Mixers in operation in this country and abroad.

► H. E. Hughes has been named manufacturing manager of the Synthetic Rubber Division of the Shell Chemical Co., Torrance, Calif. Mr. Hughes, formerly manager of the Shell polyisoprene synthetic rubber plant now under construction near Marietta, Ohio, succeeds R. L. Kittle, who has accepted a senior position with an overseas company.

► Cabot Corp., Boston, Mass., has established a new warehouse in Vernon, Calif., for the convenience and more efficient servicing of Southern California users of the company's carbon blacks and other products.

Dr. Fernley H. Banbury (center) holding his certificate of Honorary Life Membership in Tlargi. A. H. Federico (left), past chairman, presented the award to Dr. Banbury. W. M. Anderson (right) Tlargi chairman, looks on.

► A new type of warehouse construction, which reportedly lowers storage costs by as much as 80 per cent, is being employed by the B. F. Goodrich Co., Los Angeles, Calif. Two "air houses," standing side by side, provide warehouse space for 60,000 passenger tires. Each structure is shaped like a quonset hut with round ends, and provides an area of 10,027 square feet. The inflatable, airtight and watertight material is 6¼-ounce nylon fabric coated with Geon vinyl resin from Goodrich Chemical. Seventy tons of sand, placed in a sleeve along the entire bottom edge of each air house, provide ballast; this enables the structure, with additional anchoring to the paved surface, to stand firm against wind velocity up to 70 miles per hour. The new units, which have no structural supports, were manufactured for Goodrich by CID Air Structures Co., Chicago, Ill.

► Specmade Products, Inc., a subsidiary of Gross Manufacturing Co., Inc., Monrovia, Calif., has brought a patent infringement action against three jobbers and three sales representatives, in a move to protect its Cap Seal method for repairing tubeless tires without removing tire or wheel. Gross has filed three suits on behalf of Specmade Products, which holds title to the patent involved, U. S. Patent No. 2990736, issued July 4, 1961. The company claims patent infringement and "contributing to infringement," and seeks an injunction against further sales and use of the invention concerned, as well as damages for all prior sales and use. The actions cover both the Cap Seal method of tubeless tire repair and the tools employed.

► C. P. Hall Co. of California dedicated a new $225,000 warehouse and office building on June 27 in Torrance, Calif., in memory of the company's founder, the late C. P. Hall of Akron, Ohio. The new facilities provide 25,000 square feet of floor space on a three acre site in Santa Fe Industrial Park.

► Olin Mathieson Chemical Corp. has opened a sales office for organic chemicals at 3848 East Colorado Street, Pasadena, Calif. D. D. Westerfield, organic chemicals sales representative, will have his headquarters at the new office, which will service West Coast customers.

Thomas Sheppard

Named Chief Chemist

► Thomas Sheppard has been named chief chemist for the Goodyear Rubber Co., Middletown, Conn., succeeding Richard Taylor who has retired after 28 years of service. Rial Potter, Jr., previously with the Spencer Rubber Products Co., has joined Goodyear Rubber as a rubber chemist. Mr. Sheppard was graduated from Davis & Elkins College in 1951 and then joined the Naugatuck Chemical Division of U. S. Rubber Co. Prior to joining Goodyear Rubber this year, he had been associated with the B. F. Goodrich Co., American Cyanamid Co., and the Seamless Rubber Co. Mr. Sheppard is a member of the Connecticut Rubber Group.

Mr. Potter was graduated from the University of Massachusetts in 1932, and had been associated with Monsanto Chemical Co., U. S. Rubber Co., Essex Rubber Co., Armstrong Rubber Co., M. B. Electronics, and KBC Industries, Inc. He is a member of the Division of Rubber Chemistry of the American Chemical Society and the Connecticut Rubber Group.

Pyramid Acquires Firm

► Pyramid Rubber Co., Ravenna, Ohio, and its affiliated companies have acquired control of Dunhill International, Inc., in a recently announced merger. Pyramid and its firms, Harcourt Manufacturing Co. and the Archer Truck Co., Oil City, Penna., have acquired two million shares of Dunhill stock. Under the merger the two million shares will be issued to Pyramid stockholders and its associated companies for all the outstanding shares of these concerns. Pyramid will operate as a division of Dunhill until further details of the merger have been settled, company officials stated.

Huber Increasing Output

► J. M. Huber Corp., New York, N. Y., is increasing the capacity of its chemicals plant at Havre de Grace, Md., with the construction of new facilities. The new units will provide for additional production of Huber's sodium silico aluminate, Zeolex, as well as for a new product, an improved hydrated silicic acid pigment. The hydrated silicic acid pigment is an outgrowth of original work of the company performed many years ago. The quality control features designed into the new plant are expected to ensure an extremely well-controlled uniformity, which the company believes should make the product desirable for use in the rubber, paper, pesticides, and paint market. Production from the new facilities is expected about mid-1962.

► The Humble Oil polyolefin plant at Baytown, Texas, is currently being expanded by approximately 50 per cent from its initial rated capacity of 40 million pounds per year. A second expansion plan to double the capacity of the plant's annual capacity has also been approved.

Goodrich-Gulf Expanding

► Goodrich - Gulf Chemicals, Inc., Cleveland, Ohio, will increase capacity to produce cold styrene-butadiene rubber by approximately eight per cent at its Institute, West Va., plant. The expansion includes addition of polymerization reactors and related equipment. Work has started and it is anticipated that it will be completed before the end of the year. The expansion will chiefly provide for more production of light colored, non-staining types of rubber, but also will increase flexibility in production of all types of cold SBR.

Flory Receives Award

► Paul J. Flory, Stanford University professor, has won the 1962 William H. Nichols Medal of the American Chemical Society's New York Section. The gold medal, one of the highest honors in American chemistry, will be presented to Dr. Flory at a dinner to be held in March 1962. Dr. Flory is widely known for his achievements in polymer chemistry, the study of the structure of rubber, plastics, fibers, and proteins.

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Canadian News

► Edward R. Huckman has been named general sales manager of Foxboro Co., Ltd., Montreal, Canada. He will have charge of all industrial instrument sales activities in Montreal and the firm's branch offices in St. John, N. S., Toronto, Ont., Sudbury, Ont., Port Arthur, Ont., Edmonton, Alb., Calgary, Alb., and Vancouver, B. C. Mr. Huckman, a graduate of M.I.T., started his instrument career with Foxboro in 1927 at the main plant in Foxboro, Mass.

The company also announced at the same time that plans for a $600,000 addition to the Montreal plant have been completed. Contracts have been signed to give the plant a new two-story structure which will give the plant a total of 110,000 square feet, permitting a substantial increase in the production of Foxboro instruments supplied to the process industries of Canada and to export markets as well.

► A. L. McMullen has been elected vice-president and general manager of Seiberling Rubber Co. of Canada, Ltd., succeeding W. Horace Mason, who has been elected vice-president and treasurer of the parent company in Akron, Ohio. Mr. Mason will continue as president of the Canadian affiliate. Mr. McMullen, formerly vice-president in charge of production, has been with Seiberling of Canada since 1957, when he was elected by the board of directors as production vice-president and a director. Previously he had been manager of production at the Akron tire plant. Mr. Mason, who has been president of Seiberling of Canada since 1958, has been with the organization since 1926. He served in various accounting positions before his transfer to Canada in 1952 as secretary-treasurer.

► Allied Chemical Canada, Ltd., has announced it will build a diisocyanate plant somewhere in Ontario in the near future. The company stated that the new unit would be the first to make the product in Canada. No date has been set for completion of the plant, but it is expected that operations will start late in 1962.

► R. Gordon Beattie has been appointed sales manager of the Latex & Reclaim Division of the Dominion Rubber Co. Ltd., Montreal, Quebec. He succeeds D. D. Fraser, who has been transferred to the company's General Products Division in Kitchener, Ontario. A native of Montreal, Mr. Beattie received his education in Edinburgh, Scotland. During World War II, he served as a Lieutenant with the Royal Marines, returning to Canada in 1948 to join the Latex and Reclaim Division of Dominion Rubber. Since then, he has occupied the positions of production controller, purchasing agent and industrial engineering supervisor of the division. Most recently he has been special sales representative in charge of reclaim rubber sales to the Canadian rubber industry.

► Polymer Corp., Sarnia, Ont., has reported that production and sales are running ahead of last year and will establish new records again in 1961. Because of the increase, the company is planning expansion moves to cope with the increases. A new multi-million dollar butyl plant and its location will be announced by the firm in the near future, in addition to plans for a plant in Belgium, which is inside the European Market area. Construction is already underway on the new $12 million specialty rubbers plant at Strasbourg, France. In Sarnia, construction is ready to start on a $10 million plant to make polybutadiene rubber. Scheduled for production late next year, this plant will have a capacity of 20,000 tons per year.

► Employees at the Merchants Rubber Plant of the Dominion Rubber Co. Ltd., Montreal, Quebec, have voted to strike to support their wage demands. Representatives of Local 67 of the United Rubber Workers (CLC) and management have been holding talks for the past five months in an attempt to reach agreement. The union is asking for a 4c hourly increase for men and 2c for women in each year of a two-year contract. The company has replied with an offer of 3c the first year, and 1½c the second year.

Giulio Natta

Synthetic Rubber Medalist

► The First International Synthetic Rubber Gold Medal has been awarded to Dr. Giulio Natta for his discoveries in stereo-specific polymerization and isotactic polymers. Dr. Natta, director of the Institute of Industrial Chemistry of the Polytechnic Institute of Milan, was given the Gold Medal at a rubber industry dinner on October 3 in London, England, by Sir Edward Beharrell, chairman of the Dunlop Rubber Co. and of the International Synthetic Rubber Consortium.

The award is sponsored by *Rubber & Plastics Age (London)*, and selection was made by an international panel representing the rubber industries of the United States, Great Britain, France, Germany, and Holland. Establishment of the Gold Medal — to be given annually to a scientist in recognition of outstanding achievement in, and contribution to, synthetic rubber chemistry — was made during the 2nd International Congress of Synthetic Rubber, held in London in 1960.

► Dunlop Canada, Ltd., Toronto, Ontario, is offering modern plant facilities for the mixing of latex, aqueous and other dispersions, and solutions. Plant capacity is two to three million gallons a year. The company would mix solutions to customers' formulations, maintaining complete secrecy about processes. Equipment includes up-to-date dispersion and emulsifying units, mixing tanks of 2,000-gallon capacity with agitators, and 18,000-gallon storage tanks. There is a 50-ton refrigeration system; only demineralized water is used.

High road or low road . . . fabrics figure as key structural material

On the drawing board: orbiting space stations (top) fold to fit in rocket nose cone, inflate with gas. Astronauts are protected by space suits of special coated fabrics.

In the development stage: fabric fuel tanks (left) can be anchored or towed by submarine for underseas storage. Right: fabric pressurized hemispheres for on-the-bottom mining.

Problem: build orbiting space stations—durable, yet light and compact for stowing aboard rockets. *Problem:* build giant tanks to store fuel deep in the ocean—light enough for towing, strong enough for long-term anchorage. *Solutions* under consideration: specially engineered fabrics.

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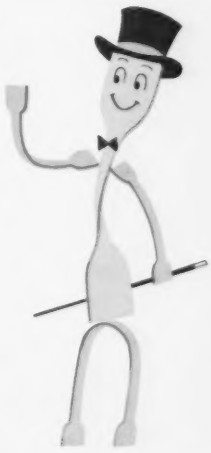


Philprene PHILLIPS 66

PHILLIPS CHEMICAL COMPANY, Rubber Chemical Sales Division, 318 Water St., Akron 8, Ohio; Sales Offices: Akron, Chicago, Dallas, Providence and Trenton; **West Coast:** Harwick Standard Chemical Company, Los Angeles, California; **Export Sales:** Phillips Petroleum International Corporation, Sumatrastrasse 27, Zurich 6, Switzerland; Distributors of Phillips Chemical Company Products, 80 Broadway, N. Y. 5, N. Y.

Obituaries

Joseph A. Talalay

► Dr. Joseph Anton Talalay, retired rubber technologist, died on October 15 in New Haven, Conn., after a brief illness. He was 79 years old. Dr. Talalay, who was connected with the rubber industry in four countries for more than 50 years, was best known for his invention of a process, used throughout the world, for the manufacture of latex foam rubber. This process bears his name. Born in Russia on January 10, 1882, he received a Ph.D. degree in physics and mathematics from the University of St. Petersburg in 1906, and a degree in mechanical engineering from the Imperial Institute of Technology in Moscow in 1913.

Upon graduation, he joined the staff of the Bogatyr Co. in Moscow as an engineer. When he left the firm and Russia in 1920, he was technical director of Bogatyr. He settled briefly in Riga, Latvia, where together with former colleagues, he founded the first Latvian Rubber Manufacturing Co. in Varonis.

In 1922, Dr. Talalay joined Nordgummiwerke A.G. in Berlin, Germany, as technical director. From 1928 to 1932, he was associated with the tire manufacturing firm of S. Herz GmbH, Berlin, as technical director. During his stay in Germany, he was one of the founding members of the Deutsche Kautchuk Gesellschaft.

Dr. Talalay left Germany in 1933 and settled in Bedford, England. Here he founded, with J. A. Howard, the inventor of rubberized hair, the Magna Rubber Co. In 1937, Magna Rubber was acquired by the Empire Rubber Co.

Dr. Talalay came to the United States in 1940 and was director of research for the Converse Rubber Co., Malden, Mass., from 1942 to 1944. In 1945, he settled in New Haven, Conn., and engaged in research and development in the latex foam rubber field.

From 1948 until his retirement in 1953, Dr. Talalay was research consultant to the Sponge Rubber Products Co., Shelton, Conn., which in the subsequent years was acquired by the B. F. Goodrich Co.

He was a member of the American Chemical Society, the Institution of the Rubber Industry (England), and the American Association for the Advancement of Science.

Dr. Talalay leaves his wife, four sons—Naum, Paul, and Anselm and Leon, general manager and technical director, respectively, of the B. F. Goodrich Sponge Products Co.—and eight grandchildren.

Robert M. Aude

► Robert M. Aude, president of the Heyden Chemical Division of Heyden Newport Chemical Corp., died on August 20 at his home in Upper Saddle River, N. J., after a short illness. He was 47 years old. Mr. Aude was born in Green Bay, Wisc., and was a graduate of the University of Wisconsin. He was active in the chemical industry for more than 20 years. Prior to joining Heyden, he was with the Monsanto Chemical Co. In the eight years that he was with Heyden, he was successively manager of the firm's Garfield and Fords, N. J., plants; director of sales planning and coordination in New York; and vice-president and general manager of the Heyden Chemical Division, prior to his appointment as president of the division in May, 1960. Mr. Aude leaves his wife, four children, and his parents.

Robert A. Goodall

► Robert A. Goodall, superintendent of tire manufacturing for the Gadsden, Ala., plant of Goodyear Tire & Rubber Co., died on July 11 at the age of 67. Mr. Goodall joined Goodyear in Akron, Ohio, when he was 17 years old, and served continuously with the company for nearly 50 years. He moved to Gadsden in 1929 and became a department foreman. After several promotions at Gadsden, he came to Goodyear Aircraft Corp. in 1942 as a general foreman, and was named production superintendent at Plant D in 1944. Returning to Gadsden in 1945, he was promoted to superintendent of tire manufacturing in 1947. He had been serving as a special assignment consultant since February of this year. Mr. Goodall leaves his widow and two sons.

Kenneth B. Cary

► Kenneth B. Cary, chairman of the board and president of Woodbridge Plastics, Inc., and the Tyson Corp., Woodbridge, N. J., died on October 11 at his home in Montclair, N. J. He was 54 years old. Mr. Cary graduated from Rensselaer Polytechnic Institute in 1929 with a B.S. in chemical engineering. He joined the Okonite Co. that year as a chemist and became chief rubber chemist four years later. From 1938 to 1945 he was manager of sales for the Insulated Wire and Cable Division of R. T. Vanderbilt Co. Mr. Cary joined Hamilton Laboratories, Inc. in 1945 as vice-president and in 1949 was appointed vice-president in charge of sales for the Burgess Chemical Co. This company was reorganized into Cary Chemicals, Inc., with Mr. Cary becoming chairman of the board and president. In 1960, he purchased the Tyson Corp. and formed Woodbridge Plastics, Inc. Mr. Cary leaves his widow, two sons and a daughter.

Theodore E. Dinsmoor

► Theodore E. Dinsmoor, deputy director of the Research & Development Division of the American Machine & Foundry Co., New York, N. Y., died on August 17 of a heart attack in Hyannis Port, Mass. He was 43 years old. Mr. Dinsmoor was graduated from the Massachusetts Institute of Technology in 1940 with a B.S. degree in mechanical engineering, and joined the Naval Ordnance Laboratory the following year. He had been with AMF since 1956, when he joined the company as director of planning applications engineering of the defense products group. He leaves his widow and two sons.

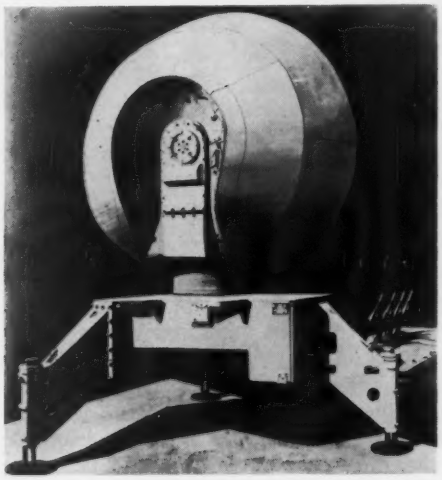
Samuel Adinoff

► Samuel Adinoff, retired chief chemist of the St. Clair Rubber Co., Marysville, Mich., died of a heart attack on June 22 while attending a civic affairs meeting in Port Huron, Mich. He was 75 years old. Born in Russia, Mr. Adinoff came to America in 1903, became a naturalized citizen and graduated from the Polytechnic Institute of Brooklyn in 1917. He served as chief chemist for St. Clair Rubber from 1928 until his retirement in 1956. He was one of the pioneer workers in the development of rubber adhesives.

New Goods

Silicone Radome Cover

► A silicone rubber-coated Radome fabric which is said to remain flexible at all temperature extremes has been introduced by Cooley, Inc. of Pawtucket, R. I. An important feature of the



silicone rubber coating is its microwave transparency, which allows transmission up to 25,000 megacycles. The new fabric is said to provide long-term protection to delicate radar equipment. The Cooley fabric used for the Radome cover is 6.35 ounces per square yard, polyester fiber balanced, and coated with a thickness of .020 plus or minus .002 of SE-100, product of the Silicone Products Department, General Electric Co., Waterford, N. Y.

Wilson Disposable Glove

► A new, disposable, touch-sensitive industrial glove has been introduced by the Wilson Rubber Co., 1200 Garfield Ave., S.W., Canton 6, Ohio. Called Tru-Touch, the glove is so sensitive, according to the manufacturer, that it permits the wearer to tell by feel whether a flipped coin is heads or tails. It is designed for inspection work, small parts handling, and any industrial operation where touch sensitivity is important, and either product or hand must be protected. The glove is .006" thick, but is said to be exceptionally tough, with a tensile strength of 1000 to 1200 psi. Tru-Touch glove is made of polyvinylchloride, providing pliability without the constriction of latex. It is also readily disposable, the company states, because of its low cost.

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Quality Control in the Rubber Industry

by

Simon Collier and Edward A. Reynolds

36 pp. 8½ x 11 in. $2.50

A new booklet designed to help the technical executive better understand and use new concepts in quality control, its organization and techniques. Originally published as a five-part article in the February through June, 1961 issues of RUBBER AGE, this booklet now makes available in one handy source all the material and data which has attracted so much industry attention.

Part I — Introduction.

Part II — Functions, Organization and Personnel. Information as to the responsibilities of other company departments and details as to the quality control organization and the training, direction and evaluation of personnel.

Part III — Statistics. Statistical methods, including routine control, experimentation, trouble shooting, evaluation and effective use for economical maintenance of product quality.

Part IV — Records, Reports and Data Handling. The need for records, the various types, and some methods for their simplification. Samples of different records and comments on QC graphs, files and data retrieval.

Part V — Engineering Aspects. Problems of specifications; visual standards, sorting inspections; automatic process controls, and non-destructive laboratory and life testing techniques.

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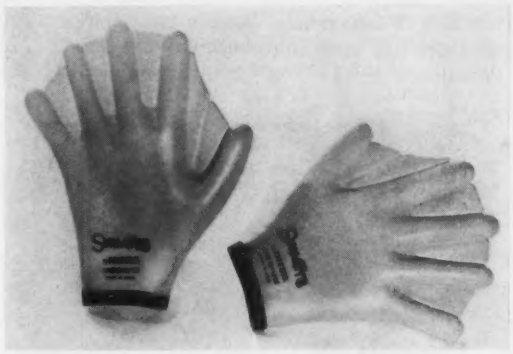
Pioneer Hand Flippers

► Flexible, lightweight hand flippers, called Swimitts, for use in swimming and skindiving, are being manufactured by the Pioneer Rubber Co., 196 Tiffin Road, Willard, Ohio. Fashioned after Mother Nature's own ingenious pattern for



speed and dexterity in water, Swimitts have webbing between the fingers which provide a broader hand surface to the water and make swimming easier. Swimitts also provide a safety factor since their brilliant orange color makes them easily visible in water, even at a distance. According to the manufacturer, Swimitts are completely flexible so that the smallest objects can be picked up and held without difficulty. In addition, finger and hand dexterity are never impaired because Swimitts are made of lightweight rubber. The hand flipper will fit either hand and are available in sizes for adults and children.

Tausend Laminated Tablecloth

► Vinyl laminated tablecloths called Cloth of Armor are available in two new patterns at Felix Tausend and Sons, 417 Fifth Ave., New York 16, N. Y. Pattern 88 is an applique design of large, white daisies, and Pattern 55 consists of white polka dots. Made exclusively with vinyl film produced by the Union Carbide Plastics Co., these look-like-linen tablecloths provide a smooth, easily-cleaned surface. The spun rayon backing gives the cloth its texture, pattern, and color, and provides a non-skid surface. Sizes range from 52 x 52-inches to 60 x 108-inches, in both round and rectangular shapes.

Vinyl Tether Ball

► A new tether ball set available from the Barr Rubber Products Co., Sandusky, Ohio, features an official size vinyl ball, as well as a rope, inflating needle and full game instructions. The entire game is enclosed in a polyethylene bag.

PHOTO, COURTESY OF UNITED RUBBER & CHEMICAL COMPANY, BAYTOWN, TEXAS

Tomorrow's Dryer...Today!

Full automation, operating efficiency, and the absolute in safety — along with high volume production — were the prime requirements listed by United Rubber & Chemical Company when they were in the market for a new dryer recently. The company's standards are exacting and high . . . they wanted, for their modern plant, a dryer that would be *modern for years to come.*

The large dryer Sargent designed and built for them has full push-button operation and control. Every possible safety device, including explosion and fire prevention, is built into the machine. It is giving United Rubber & Chemical Company absolutely dependable high volume quality production. Installed and operating within five weeks after date of delivery, the Sargent features of unusually rugged construction, economy and simplicity of operation are proving themselves every day.

This 32-section, 2-stage master batch dryer is equipped with vibrating feeder and extra-wide conveyor. It is gas-fired, with each of the six zones having its own separate heating system and temperature regulators and controls. The stock leaves the dryer at less than ½ of 1% moisture content. Full-height hinged doors and easy-to-remove panels, a Sargent feature, provide easy access to entire interior of the machine for quick, thorough cleanout. Each fan assembly, including panel, motor and fan rotor, is easily lifted off by removing four clamps. The Sargent-designed perforated flight conveyor has traveling and stationary stock guides to insure a dustless chain. The Sargent-built "No-Lube" chain never needs lubrication. Velometer ports permit airflow measurement in each zone. No air recirculation through the heaters prevents contamination. Tachometers accurately measure conveyor speeds. Automatic cut-off switches prevent any part of machine starting up accidentally while being cleaned. The entire machine automatically shuts off in case of accidental jamming of conveyor, imminent fire in any section, or other mishap, should it occur.

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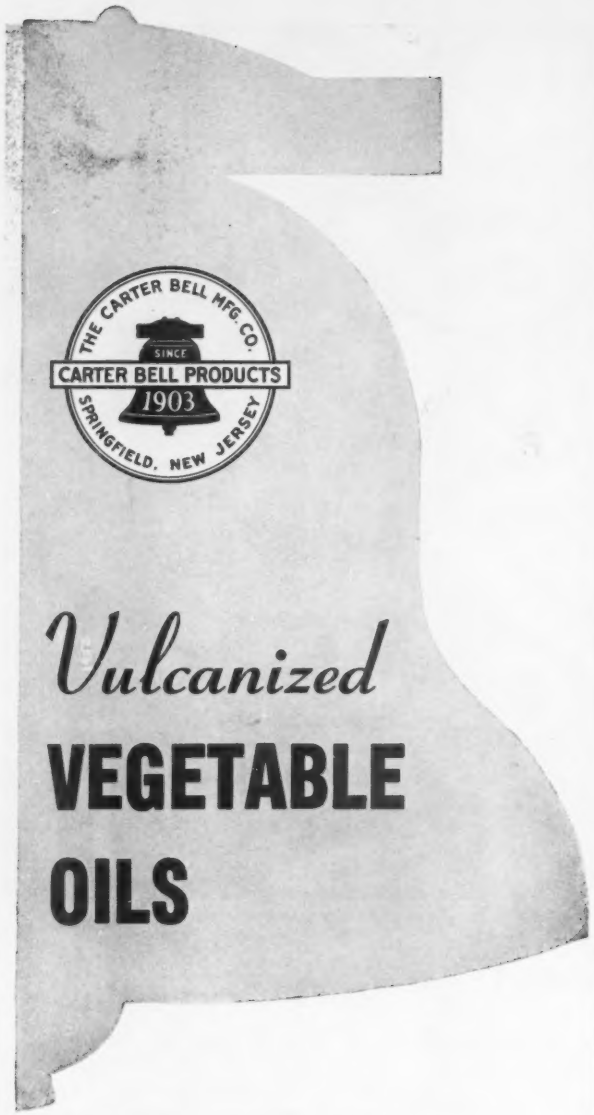

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Fabric-Backed Urethane

► A fabric-backed urethane designed to be used as a liner for handling grain, ore slurries, coal, coke, rock, sand and gravel, glass, and other abrasive materials has been developed by the Industrial Division of the Armstrong Cork Co., Lancaster, Penna. Called Armstrong PO-663, the new material is said to provide maximum abrasion resistance, reduce cost by protecting expensive chutes and equipment, have long life, allow the use of thinner gauge materials, reduce maintenance cost, and can be easily installed by cementing or bolting. PO-663 is available in standard stock sheet sizes ranging from 12 x 20 inches to 96 x 40 inches in 1/16, 1/8, and 1/4 inch gauges.

Reversible Floor Mat

► A new floor mat that is completely reversible has been developed by the American Floor Products Co., 4922 Wisconsin Avenue, N. W., Washington, D. C. Made up of 4 x 4 inch sections of ribbed polyvinyl chloride, its flexible wiping blades are designed in such a way that they are effective dirt traps. The manufacturer states that the interlocking sections of the squares give the mat a "no hole" construction feature, making the mat safe and efficient for almost any type of installation. The blocks for the mat, called Imperial, are available in a wide variety of colors. The mat may be easily rolled and taken up, and steel bar reinforced nosings eliminate corner curling and protect the mat while it is being handled.

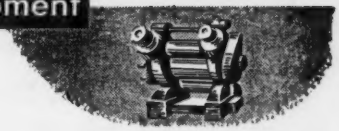
Krene Vinyl Canoe

► Kestral Corp., Springfield, Mass., is producing a toy canoe fabricated from durable Krene vinyl. The water toy, named the Hiawatha, has an opening in the middle so that it can slide around a child's body and fit snugly under the arms. It provides ample buoyancy in the water, the company states. Decorated with Indian designs printed in red and black on white, plastic, the Hiawatha Canoe inflates to 32 inches in length.

Goodrich Vinyl Sole

► Koroseal vinyl shoe soling, introduced by B. F. Goodrich Co., Akron, Ohio, is said to provide the shoe manufacturers with long-wearing soles for shoes that take a lot of abuse. The new material is available in brown and black, has a pebble finish, is lightweight, flexible, tough and can be stitched on conventional shoe-making equipment or cemented to a variety of uppers.

New Equipment



Portable Blow Tank

► A portable blow tank pneumatic conveying system for handling PVC resins and other dry plastics and chemicals has been developed by the pneumatics division of Young Machinery Co., Muncy, Penna. Features of the new design are a

minimum of moving parts in the product zone, elimination of the inlet rotary feeder normally used in positive pressure pneumatic systems, compactness, simplicity and portability for cycling and batching operations. The Young Porta-Batch pneumatic system operates on a cycle basis, with the tank alternately filling and then discharging. Butterfly valves above and below the hopper operate to keep the input line closed while the tank is being completed and the output closed while the tank is being filled.

TMI Dynstat Tester

► Testing Machines, Inc., Mineola, L.I., N. Y., has introduced the Dynstat Tester which is used for determining both the static and dynamic resistance to bending and impact of hard rubber, plastics and ceramic materials. The clamping arrangement permits testing of very small pieces of molded articles, carbon brushes, small extruded plastic pieces and similar materials. The scales on the instrument are graduated to record impact energy absorbed in kilogram centimeters and bending moment in kilogram centimeters.

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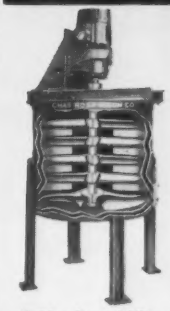
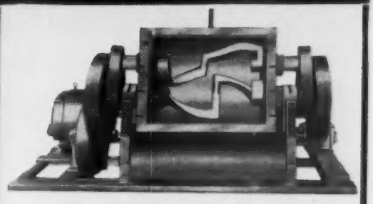
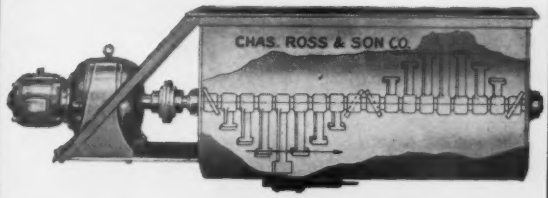


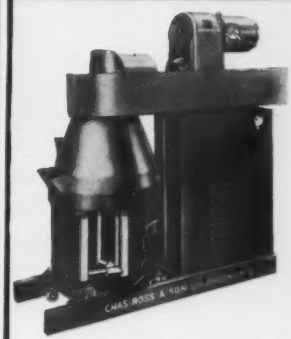
Rubber Cement Mixers
100 - 1000 Gal. Sizes



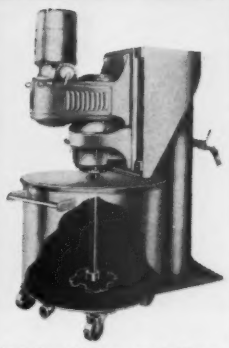
Heavy Duty Double Arm Kneaders
1 pint - 150 Gal. sizes

Rubber Reclaiming Mixers
100 - 1000 Gal. sizes



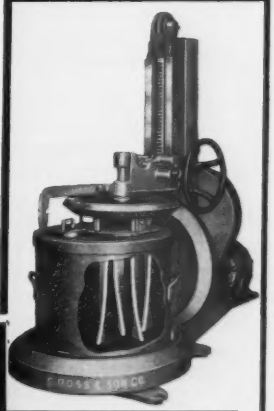


Double Planetary Change Can Mixers
1 - 150 Gal. sizes



High Speed Change Tank-Mixers
80 - 250 Gal. sizes

Heavy Duty Paste Mixers
25 - 1000 Gal. sizes



Heavy Duty Change Can Mixers
8 - 60 Gal. sizes

Also Dry Crushing and Pulverizing Mills, Three Roller Mills, Hopper Mills, High Speed Dissolvers or Dispersers, and Mixers of all types for Dry, Liquid, Paste and Heavy Paste Materials.

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Rapeseed oil produces the driest white Factice®, and this type may contain mineral oil or fillers. Compounders have found that for a loaded stock it is advantageous to use this rapeseed Factice® white, containing fillers, to reduce milling time of the compound and to improve the dispersion of fillers. Send us your compounding formula for our suggestions. All formulas held in strict confidence. Our trained staff will help in selecting the proper vulcanized vegetable oil for your need . . . Factice® White, Brown, Neophax or Amberex.

Factice STAMFORD RUBBER SUPPLY Vulcanized Oil

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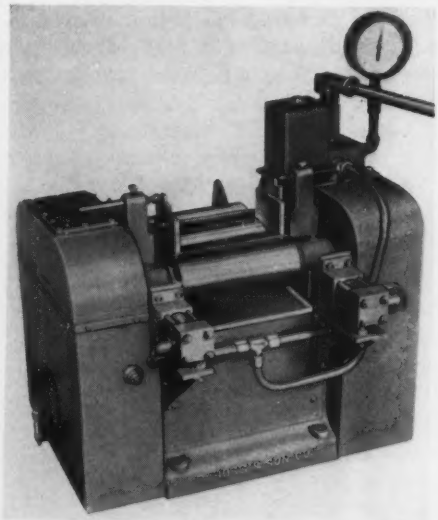
STAMFORD, CONN.

Ross Three Roll Mill

► New high speed three roll mills with simplified one point hydraulic adjustment for uniformity of production and greater output have been developed by Charles Ross & Son Co., Inc., 148 Classon Avenue, Brooklyn 5, N. Y. Mills in all sizes from 4½ x 10 inches to 16 x 40 inches are furnished with hydraulic adjustment of rolls and pressure recording gauge. With dual hydraulic adjustment, the front and back rolls can be adjusted independently; however, for floating center roll operation, the mills are provided with a single hydraulic adjustment with pressure gauge for a simplified fool-proof one point adjustment instead of the four separate points of adjustment on conventional mills, the company states. In addition, special equalizers are incorporated to assure equal pressure on both ends of the rolls at all times for parallel roll adjustment and uniform dispersion. A special overload feature is built into each mill to prevent damage to the hydraulic system if foreign matter falls into the mill.



Gyro-Ribbon Mixer

► The Gyro-Ribbon Mixer, designed primarily for small batch production and laboratory use by the machinery and equipment division of Superweld Corp., North Hollywood, Calif., maintains close tolerance between the rotor-ribbons and the chamber walls to achieve thorough and fast mixing operations. Cleaning and switching from one formula to another is said to be greatly simplified because there are no corners or other contamination traps to retard the process. Due to its hemispherical contour, it uses up to 30 per cent less floor space than conventional units of similar capacity. The mixer handles most dry, powdered or granular materials as well as semi-liquids.

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2 HP—self-contained power, 7 tons pressure.
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A new light source for testing fading and weathering of Rubber Products

ATLAS Xenon Arc

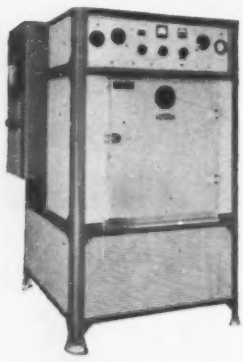
Weather-Ometer® and Fade-Ometer®

A high pressure Xenon Arc with a spectral radiation distribution very close to that of sunlight is now available in the Weather-Ometer and Fade-Ometer.

This new Xenon light source is a 6000 watt water cooled lamp which at a sample distance of 18 7/8 inches produces a rate of deterioration equal to that of noon June sunlight.

Both machines have automatic control of black panel temperature, cycles, etc. and are available with automatic control of humidity.

The Xenon lamp is available with constant wattage transformers to insure a uniform radiation intensity regardless of variation in line voltage and controls are provided for increasing the wattage to compensate for loss of intensity due to lamp aging. Anticipated useful lamp life is 2000 hours. Lamp burner tube is easily replaceable by the operator.



Xenon Weather-Ometer®
$3457.00 up

A new testing machine for fast determination of the weathering qualities of rubber products. Fully automatic operation. Sample capacity 54 specimens 3" x 9" in size. Weather-Ometers manufactured after 1953 can be converted from carbon arc to Xenon arc.

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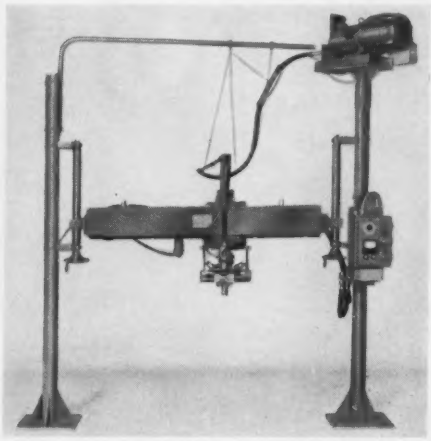
Write for complete information

ATLAS ELECTRIC DEVICES CO.
4114 N. Ravenswood Ave., Chicago 13, Ill.

Traverse Mechanism

► Air operated traverse mechanisms, dispensing devices for polyurethane foam production, are being manufactured by Martin Sweets Co., Louisville, Ken. Model AT41S is adjustable in height,



stroke and traversal rate. The rotary type, pneumatic prime mover assures smooth reciprocation through the natural cushioning of an air system. Dependable roller bearings support the carriage which cannot jam at the stroke limits, even if the limit controls are removed.

Electrically Heated Platens

► Electrically heated platens, used for vulcanizing rubber products, are being offered by the Sta-Warm Electric Co., Ravenna, Ohio. Designed and fabricated to user's specifications, the platens can also be used for setting nylon tire cord and as thermo-forming equipment. In addition, the platens are used for attaching labels having heat sensitive adhesives. Each platen employs an exclusive multiple circuit, blanket-type heating element which allows heat to be applied either uniformity or in varying watt densities. By variation of element location, "hot spots" can be created or eliminated, depending on the functional requirements of the unit.

► A small size nuclear thickness gauge, using beta radiation, has been developed by the Ohmart Corp., 2236 Bogen Street, Cincinnati 22, Ohio. Available in three models, LBKR, LBSR, and LBMS, the instrument will indicate or record the thicknesses of sheet materials up to 12 inches wide.

► Model AP-Sonogen generator, used to ultrasonicly clean rubber molds, thus eliminating time-consuming cleaning by hand, is being offered by Branson Instruments, Inc., Stamford, Conn.

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TITANIUM PIGMENT CORPORATION
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Reviews

Kautschuk-Handbuch (Rubber Handbook). Edited by S. Boström. Published by Berliner Union, Stuttgart, Germany. Four volumes, approximately 1500 pp., 6 x 9 in., DM 300 to 380.

The objective of the planned four volumes is defined in the editor's foreword, and in the publisher's advertising leaflets as an attempt to create a reference work for technologists and scientists working in the field of rubber, and in the neighboring fields, in a way similar to that provided twenty-five years ago by Hauser's "Handbuch der gesamten Kautschuktechnologie." The publication of the work, it is pointed out, required eight years, and the scientists contributing the individual chapters numbered about forty.

Below is given the review of Volume II. Reviews of Volumes I and III appeared in this column in March, 1960. Volume IV will be reviewed when received.

Volume II — Die Rohstoffe (The Raw Materials) and Verarbeitungstechnik (Fabrication Techniques).

This book is divided into two sections. Section 1, a continuation of Volume I, contains five chapters numbered 1.14 to 1.18. The first of these chapters (12 pages) is devoted to polysulfide polymers, and covers history, technology, and the properties of solid and liquid polymers. The next chapter (15 pages) deals with silicone polymers, their history, chemistry and technology. This chapter is followed by one on polyurethanes (14 pages). Polyvinyl chloride is discussed in 26 pages. The chapter on reclaim (40 pages) reviews the history of rubber reclaiming, reclaiming procedures and equipment, and properties and compounding of reclaims.

Section 2 of the book was originally organized in 14 chapters, but only 11 of these are presented in this volume. The three chapters dealing with accelerators, antioxidants, and peptizers will be reviewed in Volume IV.

The first chapter (11 pages) of Section 2, entitled "General Technology of Natural Rubber," discusses mastication, mixing, compounding principles and vulcanization. Chapter 2 (36 pages) is devoted to butadiene-styrene copolymers; processing and compounding of Buna-S3 (the original high-Mooney rubber), hot rubber, cold rubber and oil-extended polymers (OP) are discussed. Basic information is also given in this chapter for copolymers with vinyl pyridine, *cis*-1,4 polyisoprene, and *cis*-polybutadiene.

Chapter 3 (50 pages) deals with butadiene-acrylonitrile copolymers. Fundamental properties, compounding principles and typical recipes are presented. Butyl rubber is the subject of Chapter 4 (18 pages); processing, compounding and basic properties are discussed and illustrated by compounding recipes. Chapter 5 (35 pages) is titled "Fillers" and covers inorganic pigments, i.e. zinc oxide, silicates, carbonates, clays and colored pigments. Under organic pigments are discussed carbon blacks, lignin, high-styrene resins, phenolformaldehyde resins. Sulphur, selenium and tellurium are also discused in this chapter. Chapter 6 (28 pages) covers plasticizers and other compounding ingredients. Factice and petroleum-derived plasticizers are given most of the space, but vegetable oils and synthetic plasticizers, activators, retarders, antiseptics and blowing agents are also covered.

Chapter 10 (8 pages) discusses rubber colors. Chapter 11 (8 pages) deals with auxiliary materials used in rubber manufacturing such as talcum, soaps, mold release agents, lacquers and solvents. Chapter 12 (47 pages) is a discussion of textiles used by the rubber industry. Chapter 13 (64 pages) is devoted to rubber machinery

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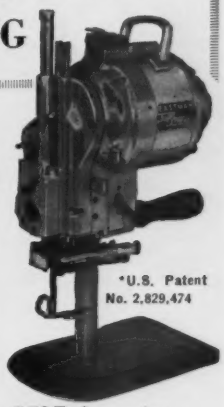

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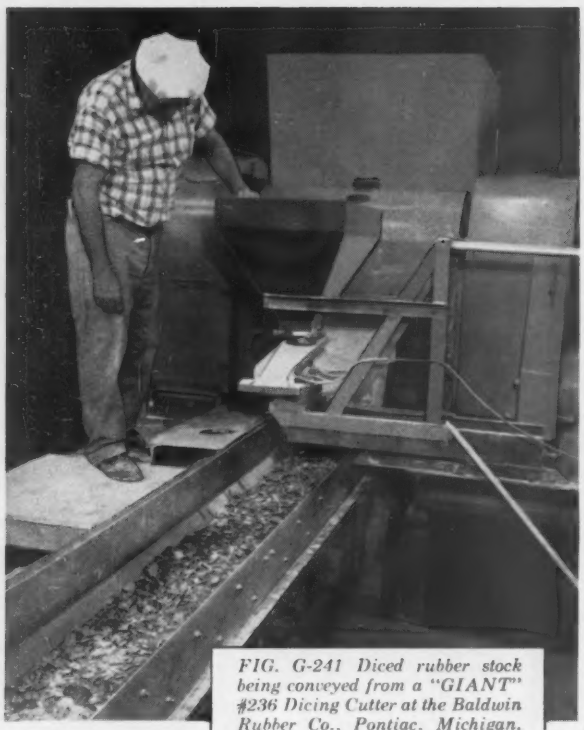

FIG. G-241 Diced rubber stock being conveyed from a "GIANT" #236 Dicing Cutter at the Baldwin Rubber Co., Pontiac, Michigan.

Dice Rubber the efficient Shear-Cutting way with "GIANT" Rubber Cutters

Dicing rubber sheet or pelletizing extruded stock is easy, quick, accurate and economical with a "Giant" Rubber Cutter. Whether you want uniform pieces for moulding, blending, conveying, automatic weighing, for feeding to extruders or a Banbury, or for dissolving, you will improve your processing methods and reduce rejects cut on a "Giant". This is because of Taylor-Stiles precision method of positive feeding and shear cutting, the most efficient method of cutting known. The cutting is concentrated at one point at a time, thus exerting tremendous "leverage", saving power and lengthening knife life. In some cases, savings in power consumption alone have paid for the machine in several years. In addition, initial cost is much less since smaller horsepower motors are required. Simple bevel edge sharpening of knives, plus the fact that they stay sharp longer, means less down time. Call or write today to get the complete story on "Giant" Rubber Cutters!

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mills, refiners, internal mixers, calenders, extruders, and equipment for the manufacturing of rubber solutions Chapter 14 (97 pages) covers other machinery and apparatus used in rubber factories. Equipment used for transportation, drying, sieving, weighing, heat softening of Buna S, grinding, cutting, granulating, impregnating, solvent recovery and vulcanization is described.

Volume II is, as the previously reviewed Volume I and Volume III, an excellent treatise on rubber technology, covering both chemical and processing aspects. European and American literature is well covered.

Some errors and misinterpretations of quoted literature have been noticed by this reviewer. On page 290, for instance, in a discussion of mineral oils, "naphthenic" and "aromatic" are confused. Such errors are bound to occur in an encyclopedic treatment of any extensive field. They detract little, however, from the value of the book, since serious students interested in details and accuracy will also consult the original literature quoted. Rubber technologists who can read technical German will find this volume a valuable source of information pertaining to both German and American practices.

F. R.

•

Progress in Dielectrics, Vol. I. Edited by J. B. Birks; American Editor, J. H. Schulman. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 6 x 9¾ in. 312 pp. $11.00.

This is the first volume in a planned series on dielectrics. The series is being published on a one-volume-a-year basis on the premise that there is a need for a common meeting ground for scientists, engineers, and technicians working on dielectric problems within the various disciplines or industries, and that they can benefit from papers which transcend a given field or have implications for more than one.

With this orientation the editors have attempted to coordinate current knowledge of dielectric phenomena, materials, and techniques, and to give a review of recent progress in different aspects of the subject. The search has taken them from physics to biology, electronics, high polymers and as far afield as radiation chemistry.

The seven papers which comprise this initial volume are equally eclectic:

(1) Dielectric Breakdown in Solid Insulation, by J. H. Mason.

(2) Directional Break-down Effects in Crystals, by J. W. Davisson.

(3) Electric Strength and High-Field Conductivity of Dielectric Liquids, by T. J. Lewis.

(4) Gaseous Dielectrics, by T. W. Liao and R. E. Plump.

(5) Ferroelectricity of Barium Titanate Single Crystals, by A. D. Franklin.

(6) Non-oxide Ceramic Dielectrics, by P. Popper.

(7) Electrophoretic Deposition of Insulating Materials, by J. B. Birks.

The first four papers in this book discuss dielectric breakdown with emphasis on solid, liquid, and gaseous dielectrics. The paper by Franklin is described by the editor as a presentation of "the substantial progress that has been made towards a unified thermodynamic theory." The paper by Popper is a review of the elements and binary compounds as potential ceramic dielectrics with attention focused on the non-metallic nitrides. The final article describes the theory and practice of electrophoretic deposition of insulation.

In brief it would seem that this first volume achieves its stated goal. While the papers themselves are

academic in approach, the commercial implications of the various topics are dealt with to an extent where further research on a given problem can be pursued with reasonable facility.

Charts, illustrations, and literature references are supplied. This volume may be of use to the reader occupied with problems of electrical insulation in the adhesives industry. It would certainly be a valuable addition to a good technical library on the subject.

BOOKLETS, CATALOGS, etc.

Man-Made Fibers. Public Relations Department, Man-Made Fiber Producers Association, Inc., 350 Fifth Ave., New York 1, N. Y. 5 x 7 in. 32 pp.

This fact book on the man-made fiber producing industry in the United States briefly tells the history and growth of the industry and cites facts to illustrate the important contributions it makes to the nation's economy. The literature covers such subjects as plant locations, plant investment, employees, payrolls, pay rates, employee benefits, employee stability, raw material purchases, utility and fuel bills, haulage costs, range of uses, consumer acceptance, and trademarks. Also included is a chart showing fiber consumption in the United States from 1920 to 1960.

•

Aluminum Pigments in Latex Systems. (Technical Bulletin No. 110.) Metals Disintegrating Co., Inc., Elizabeth (B), N. J. 8½ x 11 in. 5 pp.

A method for incorporating aluminum pigments into latex and resin emulsion systems is discussed in this revised bulletin, which supersedes Nos. 106, 107 and 108. Formulation, pigmentation, precautions and licensing are some of the topics discussed. Also included is a bibliography of bulletins, published by various companies, covering the use of their products in conjunction with the process owned by Metals Disintegrating Co.

•

The "War Baby" that Grew Up into a Peace-Time Giant. International Synthetic Rubber Co. Ltd., Hythe, Southampton, England. 9¼ x 11½ in. 16 pp.

This colorful, illustrated booklet gives a brief outline of the development of the synthetic rubber industry, with graphs showing its growth in world consumption. It describes the facilities of the I.S.R. plant, as well as the Intol range of synthetic rubbers being produced. The cold emulsion polymerization process is outlined, with diagrams and photographs, and some important applications of SBR rubbers are suggested.

•

Colloid Mills and Dispersator Mixers. Premier Mill Corp., 224 Fifth Ave., New York, N. Y.

This illustrated booklet contains information on the application of a complete line of colloid mills and dispersator mixers, as well as tabular data which will enable plant engineers and purchasing people to select the proper equipment for their particular problem. The equipment is designed for processes involving dispersing, emulsifying, disintegrating, and homogenizing in the chemicals, food, pharmaceuticals, cosmetics, ink, paint, and petroleum processing fields.

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MARKET REPORTS

TRENDS
NEWS
PRICES

Natural Rubber

The price of spot rubber on the New York Commodity Exchange moved in the very narrow range of 187 points since our last report (October 2), high for the period being 29.62c reached on October 18 and the two following days, with a low of 27.75c reached on the last day of the month after a gradual falling off from the high. The average price of spot rubber for the month of October was 29.28 based on 22 trading days. This compares with an average of 30.22c for September.

Commodity experts at Merrill Lynch, Pierce, Fenner & Smith point out that there is no rush to buy rubber for immediate use, since this has been done some time ago. It is this explanation that may account for the fact that domestic prices have held the level of the past few weeks, while foreign prices have drifted into the early 1961 low area. Toward the end of the month, prices drifted lower almost entirely without any new developments and consequent selling pressure. Forward demand is quiet.

This fact can be accounted for because many consumers are in a good inventory position, primarily because of temporarily reduced demand from the strike-plagued automobile industry. Some of this potential demand has thus been delayed until 1962. The Merrill Lynch, Pierce, Fenner & Smith spokesmen suggest that it is conceivable that next year may start in a somewhat brighter note, based on the above contention. The anticipation of an excellent 1962 car year may also help the rubber picture.

World Scene

On the world scene, however, production is expected to exceed consumption this year, and the gradual coming of age of the high-yield trees in Asia will be able to cope with increasing demand. Synthetic rubber also stands ready to absorb even more of natural rubber's market, although an assistant labor minister of the independent government of Malaya, perhaps facetiously, predicts that the day is coming when natural rubber will push its synthetic competitor back to the latter's pre-World War II status as a laboratory curiosity.

Perhaps some of the drift in the month's prices can be attributed to the long wait for the revision in the Government's stockpile rubber sales plan that was announced as the month ended. The announcement follows closely a new plan announced earlier this week by the London Board of Trade. The new G.S.A. program now places no limit on rubber sales when contract prices are 32c a pound or more. Revision also stipulates that when prices are below 32c (as they have been since May of this year) sales will be restricted to a maximum 5,000 long tons a month. What effect this announcement will have on the market will shortly be evident.

NEW YORK, NOVEMBER 1, 1961

Price Data

Closing Rubber Prices on New York Commodity Exchange

OCTOBER 1 TO OCTOBER 31

Oct.	Spot	Nov.	Jan.	Mar.	Sales
1	....	....	....	....	..
2	29.38	29.45	28.85	28.65	8
3	29.50	29.50	29.10	28.75	2
4	29.50	29.50	29.15	28.75	10
5	29.50	29.50	29.00	28.75	0
6	29.50	29.45	29.00	28.75	5
7	....	....	....	....	..
8	....	....	....	....	..
9	29.50	29.45	29.00	28.85	0
10	29.50	29.55	28.95	28.70	0
11	29.50	29.40	28.95	28.80	3
12	29.38	29.30	28.65	28.45	32
13	29.38	29.30	28.80	28.75	1
14	....	....	....	....	..
15	....	....	....	....	..
16	29.50	29.70	29.00	28.85	0
17	29.50	29.60	28.90	28.75	3
18	29.62	29.80	29.10	28.90	0
19	29.62	29.65	29.10	28.80	21
20	29.62	29.70	29.10	28.80	7
21	....	....	....	....	..
22	....	....	....	....	..
23	29.50	29.60	28.85	28.65	0
24	29.38	29.40	28.80	28.45	1
25	29.25	29.08	28.50	28.25	10
26	29.12	29.10	28.55	28.30	35
27	28.75	28.65	28.10	28.00	8
28	....	....	....	....	..
29	....	....	....	....	..
30	28.00	27.70	27.45	27.20	34
31	27.75	27.95	27.45	27.40	25

Outside Market

No. 1 Ribbed Smoked Sheets:	
Spot	.27¾
Dec.	.27¾
Jan.-Mar.	.27⅜
Thin Latex Crepe:	
Spot	.31¾
Thin Brown Crepe, No. 2	.27
Flat Bark Crepe	.21¾

London Market
(Standard Smoked Sheets)

Dec.	26.83 — 27.12
Jan.	27.27 — 27.41

Singapore Market
(Standard Smoked Sheets)

Dec.	24.87 — 24.91

Middling Upland Quotations

	Sept. 29	October 31		
	Close	High	Low	Close
Dec.	34.46	34.69	34.63	34.63
Mar.	34.85	35.40	35.40	35.38
May	35.53	35.86	35.83	35.71

Notes & Quotes

"We believe that the United States must form a trade partnership with the European Common Market and take the leadership in further expanding a free world economic community," stated two ranking officials of the Eisenhower and Truman administrations. The proposal was made recently by Christian Herter, former Secretary of State, and Will Clayton, former Under Secretary of State for Economic Affairs, in a proposal to a Congressional subcommittee on foreign economic policy.

Synthetic Rubber

Synthetic rubber is well on its way to replacing the plantation grown product, according to the *New York Journal of Commerce*. Their evaluation comes at a time when natural rubber sales by the General Services Administration are the subject of new Congressional committee investigations, and on the heels of changes in the sales policies of both the G.S.A. and the London Board of Trade. Both groups have essentially made more liberal their sales policies in order to reduce stockpiles of natural rubber by sales to the open market.

In developing its evaluation, the *Journal of Commerce* cites the fact that over 75 per cent of all rubber consumed in this country is synthetic. The rate of synthetic rubber over natural rubber could well grow to 85 or 90 per cent of total consumption in ten years, they believe, with the introduction of polyisoprene and polybutadiene.

These synthetics have become helpful tools in the struggle by the synthetic rubber industry to reduce reliance on natural rubber. This is true despite the instances when a natural rubber consumer has switched to a synthetic, found it could not do the job, and reverted back to the natural product.

Synthetic rubber industry sales have lagged this year, but expectations are that the industry will pick up next year as availability and acceptance of the newer materials improves. Also tied into the picture is the anticipated increase in automotive production and an improving overall economic situation.

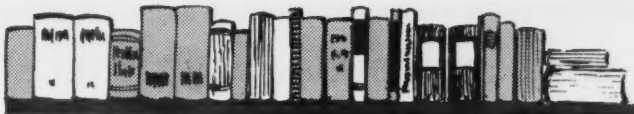
For 1962, predictions of automobile production have ranged from 6½ to 7¼ million units. This year, output is not expected to go over 6 million.

If 1962 production reaches the minimum level cited above, the synthetic rubber industry will be given quite a boost. At the current time, synthetic rubber producers are running at about 75 per cent of capacity, and 1961 consumption is expected to be down about 20,000 long tons to 1,060,000 tons.

The disappointing situation that existed in the synthetic rubber industry earlier this year is now starting to pick up sharply. This is a result of an improving economy, although the industry still has a way to go to match production and consumption of 1960.

Total synthetic rubber production for the first seven months of 1961 totaled 769,463 long tons, down 106,376 from the first seven months of 1960. Consumption for the first seven months is down 50,752 long tons, as against 646,364 long tons for the comparable period in 1960.

While production and consumption of all synthetic rubber is showing growth over the long range, the output of the stereospecifics is blossoming, with productivity nearly doubled by the opening of the Orange, Texas, plant of Firestone Tire & Rubber Co.



rubber industry bookshelf

The most important book on rubber since Davis & Blake's "Chemistry and Technology of Rubber"

THE APPLIED SCIENCE OF RUBBER

Edited by W. J. S. Naunton $32.50

Here is an advanced comprehensive textbook of rubber technology which combines theory and practice. It is written by twenty-five eminent contributors, each of whom has extensive industrial experience. The book contains over 300 illustrations and the bibliographies have over two thousand references. In compiling so comprehensive a book, which covers compounding and processing, it is essential that the contributors should have more than an academic knowledge of their subjects, and the question arose whether the rubber industry would allow their experts to contribute frankly and without restraint to such a publication. In no case was an invited contributor refused such permission. The result is *the most practical text book on rubber published to date.*

SYNTHETIC RUBBER TECHNOLOGY

by W. S. Penn $8.50

Volume I of a planned two-volume series, this is the first practical textbook devoted to the compounding and processing of the major synthetic rubbers . . . major from the standpoint that they are standard polymers whose techniques, although they will obviously change, will change more slowly than other synthetic rubbers not covered in the first volume. Elastomers covered in the current work include SBR, butyl rubber, neoprene, nitrile rubber, silicone rubber, Thiokol and high styrene resins. Modern and practical compounding techniques are given.

RUBBER TO METAL BONDING

by S. Buchan $7.50

This fully revised and up-dated edition of Dr. Buchan's important and comprehensive work includes the many advances and new developments in the technology of bonding rubber-to-metal in the ten years since the publication of the widely-acclaimed original edition. It describes processes, applications and methods in detail. It gives concise, straightforward explanations of how to handle rubber-to-metal bonds at each stage of the job. Sufficient data are included with each description to permit the reader to project examples to his own needs.

Please send me the following books:

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- ☐ Synthetic Rubber Technology, Vol. I, by Penn, $8.50
- ☐ Rubber to Metal Bonding (Revised), by Buchan, $7.50

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PRICES OF COMMERCIALLY AVAILABLE

Dry Rubber

(per pound carload)

Butadiene-Acrylonitrile Types

Butaprene NF	.4900	1
Butaprene NH	.6500	3
Butaprene NL	.5000	1
Butaprene NXM	.5800	1
Chemigum N3NS and N5	.5800	3
Chemigum N6	.5000	3
Chemigum N6B	.5000	3
Chemigum N7	.5000	3
Chemigum N8	.5000	3
Chemigum N600	.5000	3
Herecol N-33	.6800	3
Hycar 1001 and 1041	.5800	3
Hycar 1002	.5000	3
Hycar 1014	.6000	3
Hycar 1042 and 1043	.5000	3
Hycar 1051	.5800	3
Hycar 1052	.5000	3
Hycar 1053	.5000	3
Hycar 1072	.6400	3
Hycar 1203	.4600	3
Hycar 1312	.5000	3
Hycar 1411	.6200	3
Hycar 1432	.5900	3
Hycar 1441	.6200	3
Paracril AJ	.4850	3
Paracril B	.5000	3
Paracril BJ	.5000	3
Paracril BLT and BJLT	.5000	3
Paracril C and CLT	.5800	3
Paracril CV	.6300	3
Paracril D	.6500	3
Paracril 18-80	.6000	3
Paracril OZO	.4600	3
Polysar Krynac 800	.5000	3
Polysar Krynac 801 and 805	.5800	3
Polysar Krynac 802	.5000	3
Polysar Krynac 803 and 804	.5000	3

Butadiene-Styrene Types

Ameripol 1002	.2435	3
Ameripol 1006	.2410	3
Ameripol 1006 (crumb)	.2475	3
Ameripol 1007	.2410	3
Ameripol 1009	.2475	3
Ameripol 1009 (crumb)	.2590	3
Ameripol 1011	.2475	3
Ameripol 1012	.2425	3
Ameripol 1012 (crumb)	.2490	3
Ameripol 1013	.2410	3
Ameripol 1013 (crumb)	.2615	3
Ameripol 1500 and 1501	.2410	3
Ameripol 1502	.2410	3
Ameripol 1509 and 1511	.2410	3
Ameripol 1000 and 1001	.2410	3
Ameripol 1605	.1900	3
Ameripol 1606	.1820	3
Ameripol 1608	.1845	3
Ameripol 1609	.2080	3
Ameripol 1610	.1870	3
Ameripol 1703	.2060	3
Ameripol 1705	.2035	3
Ameripol 1707	.1910	3
Ameripol 1708	.1910	3
Ameripol 1710	.1885	3
Ameripol 1712	.1885	3
Ameripol 1805	.1550	3
Ameripol 1808	.1480	3
Ameripol 1809	.1545	3
Ameripol 1810	.1400	3
Ameripol 4600 and 4601	.2410	3
Ameripol 4604	.2410	3
Ameripol 4651	.1770	3
Ameripol 4659	.1820	3
Ameripol 4660	.1870	3
Ameripol 4664	.1845	3
Ameripol 4667	.2080	3
Ameripol 4700	.1750	3
Ameripol 4756	.1545	3
Ameripol 4758	.1450	3
Ameripol 4759	.1598	3
Ameripol 4760	.1576	3
Ameripol 4761	.1710	3
ASRC 1000	.2410	3
ASRC 1001 and 1004	.2410	3
ASRC 1006	.2410	3
ASRC 1009	.2475	3
ASRC 1018	.2700	3
ASRC 1019	.2650	3
ASRC 1500 and 1502	.2410	3
ASRC 1503	.2625	3
ASRC 1703	.2060	3
ASRC 1708	.1910	3
ASRC 1712	.1885	3
ASRC 1713	.1750	3
ASRC 3105 and 3106	.2410	3
ASRC 3110	.2600	3
B-123	.1820	3
Baytown B-134	.1900	3
Baytown 1600	.1930	3
Baytown 1601	.1930	3
Baytown 1602	.1930	3
Baytown 1603A	.1960	3
Baytown 1605A	.1900	3
Baytown 1606	.1820	3
Baytown 1608	.1845	3
Baytown 1609	.2080	3
Baytown 1801	.1760	3
Baytown 1803A	.1740	3
Baytown 1805A	.1550	3
Baytown 1808	.1480	3
Baytown 1811	.1569	3
Baytown 1813	.1640	3
Baytown 1815	.1496	3
Baytown 1816	.1580	3
Baytown 8600	.2410	3
Baytown 8676	.1876	3
Baytown 8679	.2022	3
Baytown 8681	.1835	3
Baytown 8682	.1890	3
Baytown 8700	.1885	3
Baytown 8775	.1545	3
Baytown 8776	.1679	3
Baytown 8781	.1655	3
Baytown 8782	.1583	3
Baytown 8783	.1515	3
Baytown 8784	.1598	3
C-102 (Shell)	.2300	3
Carbomix 1606	.1820	3
Carbomix 1608	.1845	3
Carbomix 1609	.2080	3
Carbomix 1808	.1480	3
Carbomix 1809	.1545	3
Carbomix 1811	.1569	3
Carbomix 1813	.1640	3
Carbomix 1814	.1545	3
Carbomix 1815	.1496	3
Carbomix 1817	.1715	3
Carbomix 3761	.1576	3
Carbomix 3764	.1685	3
CB-102 (Shell)	.1850	3
Copo 1006	.2410	3
Copo 1500	.2410	3
Copo 1502	.2410	3
Copo 1505 NS	.2610	3
Copo 1507	.2410	3
Copo 1510	.2410	3
Copo 1712	.1885	3
Copo 1713	.1750	3
Copo 1714	.1725	3
Copo 1778	.1910	3
FR-S 146	.2410	3
FR-S 158	.3000	3
FR-S 173	.2060	3
FR-S 178	.1910	3
FR-S 181 and 182	.2410	3
FR-S 184	.1885	3
FR-S 1000	.2410	3
FR-S 1001	.1410	3
FR-S 1004 and 1006	.2410	3
FR-S 1007	.2410	3
FR-S 1009	.2475	3
FR-S 1010	.2600	3
FR-S 1012	.2425	3
FR-S 1013	.2410	3
FR-S 1014	.2810	3
FR-S 1500 and 1502	.2410	3
FR-S 1703	.2060	3
FR-S 1710 and 1712	.1885	3
Gentro 1500	.2410	3
Gentro 1712	.1885	3
Gentro-Jet 9152	.2080	3
Gentro-Jet 9153	.1820	3
Gentro-Jet 9154	.1845	3
Gentro-Jet 9250	.1580	3
Gentro-Jet 9251	.1640	3
Gentro-Jet 9252	.1670	3
Gentro-Jet 9275	.1500	3
Naugapol 1015	.3500	3
Naugapol 1016	.2650	3
Naugapol 1018	.2550	3
Naugapol 1019	.2410	3
Naugapol 1022	.3050	3
Naugapol 1023	.3300	3
Naugapol 1503	.2410	3
Naugapol 1504	.3500	3
Naugapol 6003	.2410	3
Naugapol 6100	.3200	3
OB-102 (Shell)	.1825	3
OB-104 (Shell)	.1475	3
OB-106 (Shell)	.1510	3
OB-110 (Shell)	.1410	3
OB-111 (Shell)	.1540	3
OB-113C (Shell)	.1750	3
OB-114C (Shell)	.1420	3
OB-116 (Shell)	.1810	3
Philprene 1000	.2410	1
Philprene 1006	.2410	1
Philprene 1009	.2475	1
Philprene 1018	.2700	1
Philprene 1019	.2650	1
Philprene 1500 and 1502	.2410	3
Philprene 1503	.2625	1
Philprene 1601	.1930	1
Philprene 1603	.1960	1
Philprene 1605	.1900	1
Philprene 1606	.1820	1
Philprene 1608	.1845	1
Philprene 1609	.2080	1
Philprene 1703	.2060	1
Philprene 1708	.1910	1
Philprene 1712	.1885	1
Philprene 1803	.1740	1
Philprene 1805	.1550	1
Philprene 1808	.1480	1
Plioflex 1006	.2410	3
Plioflex 1500C	.2410	3
Plioflex 1502	.2410	3
Plioflex 1507	.2410	3
Plioflex 1508	.2410	3
Plioflex 1510	.2410	3
Plioflex 1712C	.1885	3
Plioflex 1713	.1750	3
Plioflex 1714C	.1725	3
Plioflex 1773	.2060	3
Plioflex 1778	.1910	3
Polysar Kryflex 200	.2510	1
Polysar Kryflex 202	.2535	1
Polysar Kryflex 252	.2700	1
Polysar Krylene, NS and 602	.2410	1
Polysar Krynol 651 and 653	.1885	1
Polysar Krynol 652 and 654	.1910	1
Polysar Krynol 655	.1885	1
Polysar S and S-630	.2410	1
Polysar SS-250	.2875	3
Polysar S-X370	.2475	1
Polysar S-X371	.2550	1
S-1000	.2410	3
S-1006	.2410	3
S-1009	.2475	3
S-1011	.2475	3
S-1013	.2410	3
S-1024	.2410	3
S-1500	.2410	3
S-1502	.2410	3
S-1509	.2410	3
S-1600	.1825	2
S-1602	.1825	2
S-1604	.1825	2
S-1605	.1800	2
S-1607	.1750	2
S-1608	.1790	2
S-1703	.2060	3
S-1707	.1910	3
S-1709	.1885	3
S-1712	.1885	3
S-1778	.1910	3
S-1800	.1475	2
S-1802	.1410	2
S-1803	.1650	2
S-1806	.1510	2
S-1807	.1540	2
S-1808	.1420	2
S-1813	.1580	2
S-1814	.1490	2
S-1815	.1440	2
S-7501	.2410	3
S-7652	.1960	3
S-7702	.1750	3
S-7758	.1565	2
SP-102	.2700	3
SP-103	.2700	3
Synpol 1000 and 1001	.2410	1
Synpol 1002	.2435	1
Synpol 1006	.2410	1
Synpol 1007	.2410	1
Synpol 1009	.2475	1
Synpol 1012	.2425	1
Synpol 1013	.2410	1
Synpol 1061 and 1500	.2410	1
Synpol 1502	.2410	1
Synpol 1551	.2410	1
Synpol 1703	.2060	1
Synpol 1707 and 1708	.1910	1
Synpol 1712	.1885	1
Synpol 8103	.2401	1
Synpol 8151	.1820	1
Synpol 8152	.1860	1
Synpol 8200	.1910	1
Synpol 8201	.1750	1
Synpol 8202	.1725	1
Synpol 8208	.1750	1
Synpol 8255	.1480	1
Synpol 8253	.1584	1
Synpol 8254	.1545	1
Synpol 8266	.1598	1
Synpol 8267	.1640	1

SYNTHETIC RUBBER POLYMERS

Butyl Rubbers

Enjay Butyl 035 and 150	.2300 [3]
Enjay Butyl 165 NS	.2400 [3]
Enjay Butyl 215 and 217	.2300 [3]
Enjay Butyl 218	.2300 [3]
Enjay Butyl 268 NS	.2400 [3]
Enjay Butyl 325	.2300 [3]
Enjay Butyl 365 NS	.2400 [3]
Enjay Butyl 10-65 and 10-66	.3000 [3]
Enjay Butyl 10-67	.3000 [3]
Polysar Butyl 100 and 200	.2300 [4]
Polysar Butyl 101	.2775 [4]
Polysar Butyl 300 and 301	.2300 [4]
Polysar Butyl 400	.2300 [4]
Polysar Butyl 402, 450	.2400 [4]
Polysar Butyl 600	.2750 [4]

Chlorosulfonated Polyethylene

Hypalon 20	.4700 [3]
Hypalon 30	.6000 [3]
Hypalon 40	.5000 [3]

Fluoroelastomers

Fluorel	$10.25 [4]
Kel-F 3700 and 5500	$16.00 [2]
Viton A and A-HV	$10.00 [2]
Viton B	$10.00 [2]

Isoprene Rubber

Shell 305	.2500 [2]
Shell 307	.2600 [2]
Shell 500	.2150 [2]

Neoprene

	(prices l.c.l.)
Neoprene Types AC and CG	.5500 [3]
Neoprene Type AD	.5500 [3]
Neoprene Type FB	.6500 [3]
Neoprene Type GN	.4100 [3]
Neoprene Type GN-A	.4100 [3]
Neoprene Type GRT	.4200 [3]
Neoprene Type KNR	.7500 [3]
Neoprene Type S	.4200 [3]
Neoprene Type W	.3900 [3]
Neoprene Type WB	.4100 [3]
Neoprene Type WHV	.3700 [3]
Neoprene Type WRT	.4500 [3]
Neoprene Type WX	.4100 [3]

Polyacrylate Rubber

Thiacryl 36	1.340 [3]

Polysulfide Rubbers

	(prices l.c.l.)
Thiokol Type A	.6000 [2]
Thiokol Type FA	.7400 [2]
Thiokol Type ST	1.2500 [3]

Silicone Rubbers*

	(prices l.c.l.)
GE (compounded)	2.17 [3]
GE Silicone Gum (not compounded)	3.68 [3]
Silastic (compounded)	2.56 [3]
Silastic (gums)	4.00 [3]
Union Carbide (gums)	4.00 [3]
Union Carbide (compounds)	2.50 [3]

Latex

(per pound carload)

Butadiene-Acrylonitrile Types

Butaprene N-300	.4600 [1]
Butaprene N-400	.5400 [1]
Butaprene N-401	.5400 [1]
Chemigum 200	.4800 [3]
Chemigum 235	.5300 [3]
Chemigum 236	.5300 [3]
Chemigum 245	.4500 [3]
Chemigum 246	.4500 [3]
Chemigum 247	.4500 [3]
Chemigum 248	.4500 [3]
Hycar 1512	.4500 [3]
Hycar 1551	.5300 [3]
Hycar 1552	.4500 [3]
Hycar 1561	.5300 [3]
Hycar 1562	.4500 [3]
Hycar 1571	.5300 [3]
Hycar 1572	.4500 [3]
Hycar 1577	.4500 [3]
Nitrex 2612	.4500 [1]
Nitrex 2616	.5300 [1]
Nitrex 2620	.4500 [1]
Nitrex 2625	.4500 [1]
Polysar Latex XPRD-845	.4900 [2]
Tylac 640 and 650	.4500 [1]
Tylac 750	.4900 [3]
Tylac 850	.5300 [1]
Tylac 1640 and 1650	.5400 [1]
Tylac 2430	.5000 [1]
Tylac 2830	.4500 [1]

Butadiene-Styrene Types

CL-101 (Shell)	.2800 [3]
Copo 2000	.2750 [3]
Copo 2101	.3000 [3]
Copo 2102	.3200 [3]
Copo 2105	.3200 [3]
Copo 2108	.3000 [3]
Copo 2109	.2775 [3]
Copo 2110	.3200 [3]
Copo 3852	.3000 [3]
FR-S 110	.3000 [3]
FR-S 150	.3000 [3]
FR-S 151	.2900 [5]
FR-S 174	.2950 [3]
FR-S 176	.2775 [3]
FR-S 2000	.2775 [3]
FR-S 2001	.2775 [3]
FR-S 2002	.3000 [3]
FR-S 2003	.3050 [3]
FR-S 2004	.3050 [3]
FR-S 2006	.2900 [3]
FR-S 2105	.3200 [3]
Naugatex 2000 and 2001	.2750 [1]
Naugatex 2002	.3000 [1]
Naugatex 2006	.2900 [4]
Naugatex 2105 and 2107	.3200 [1]
Naugatex 2108	.3000 [1]
Naugatex 2113	.2900 [1]
Naugatex J-8174-F	.3200 [1]
Naugatex J-8855	.3000 [1]
Naugatex J-9049	.2750 [2]
Naugatex J-9064	.3050 [1]
Pliolite 2000 and 2001	.2775 [3]
Pliolite 2076	.2900 [3]
Pliolite 2104	.3200 [3]
Pliolite 2105 and 2107	.3200 [3]
Pliolite 2108	.3000 [3]
Polysar Latex IV	.2775 [2]
Polysar Latex 722	.3200 [2]
Polysar Latex 723	.3200 [2]
Polysar Latex 741	.3000 [2]
Polysar Latex 781	.6750 [2]
S-2000 and S-2006	.2600 [3]
S-2101	.2600 [3]
S-2105	.2800 [3]
S-2108	.2900 [3]
Tylac 405, 430, 450A	.2750 [1]
Tylac 410	.2900 [1]
Tylac 1705	.3200 [1]
Tylac 1757	.3000 [1]
Tylac 3040 and 3340	.3200 [1]
Tylac 3410-A	.2750 [1]
Tylac 3500-L	.2950 [1]
Tylac 3540	.3200 [1]

Butyl

Butyl Latex 80-21	.3500 [3]

Neoprene

Neoprene Latex 60	.4000 [3]
Neoprene Latex 571	.3700 [3]
Neoprene Latex 572	.3900 [3]
Neoprene Latex 601-A	.4000 [3]
Neoprene Latex 673	.5000 [3]
Neoprene Latex 735	.3800 [3]
Neoprene Latex 736	.3800 [2]
Neoprene Latex 842-A	.3500 [2]
Neoprene Latex 950	.4700 [3]

Polysulfide Rubbers

Thiokol Type MX	.8000 [4]
Thiokol Type WD-2	1.2500 [3]
Thiokol Type WD-6	.8000 [3]

Notes: (1) Freight allowed. (2) Freight extra. (3) Freight prepaid. (4) Freight equalized. *Covers a wide range of compounds. Readers are urged to check specific prices with producers.

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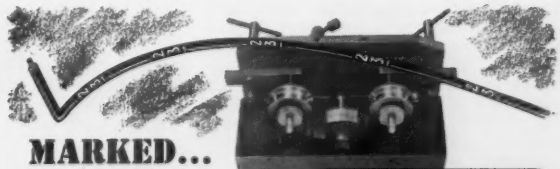

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MARKETS

(continued)

Reclaimed Rubber

In the first nine months of this year a total of 195,643 long tons of reclaimed rubber was produced in the United States. The Rubber Manufacturers' Association reports that in a similar period in 1960, 227,191 long tons had been produced.

Consumption for this nine month period in 1961 totalled 183,950, and as of September 31, stocks on hand were 31,792 long tons. This is a decline from the previous month's stocks, and also from stocks on hand at the end of September, 1960.

Consumption during the first nine months of 1960 totalled 212,840 long tons, revealing a net decline in 1961 of 28,890 long tons from the previous year's total at this time. It can be assumed that the lower consumption in 1961 of reclaim is a function of the same factors in the economy that have lowered consumption of both synthetic and natural rubbers.

(Prices for All Areas Except West Coast)
(Average price, carload quantities, minimum freight allowed)

	per lb.
First Line Whole Tire	.11½
First Line Whole Tire Stainless	.12¼
Second Line Whole Tire	.11
Third Line Whole Tire	.10¾
Fourth Line Whole Tire	.10¼
Black Carcass	.15¾
Peelings	.11½
Butyl Tube	.16
Natural Rubber Black Tube	.17
Natural Rubber Red Tube	.21
Mechanical, Light Color, Low Gravity	.26
Mechanical, Light Color, Medium Gravity	.20

Scrap Rubber

Scrap rubber activity is running at steady levels, as it has over the past few weeks with movements involving substantial tonnages reported.

Consumption is now somewhat ahead of last year's levels, according to some dealers. The Rubber Manufacturer's Association has reported that in the first nine months of this year a total of 181,769 long tons were consumed with a September consumption figure of 18,932 long tons. Total stocks at the end of the month were 72,348 long tons.

Scrap rubber exports during July totalled 2,800,024 pounds with a dollar value of $126,124. These figures were below the 3,201,933 pounds shipped in the previous month. Spain was once again the leading importer of scrap rubber, taking 796,466.

(Prices Delivered Akron)

Mixed tires	ton	14.00
Light colored carcass	lb.	.07
No. 1 peelings	ton	38.00
No. 2 peelings	ton	27.00
No. 3 peelings	ton	20.00
Buffings	ton	14.00
Truck and Bus S.A.G.	ton	17.50
Passenger S.A.G.	ton	17.50
Natural Rubber Red Tubes	lb.	.08
Natural Rubber Black Tubes	lb.	.06¾
Butyl Rubber Tubes	lb.	.07½

Tire Fabrics

Initial shipments of a "significantly improved" nylon tire yarn, and a large increase in productivity, have been announced by DuPont. In the evaluation tests on the new yarn, tire companies have reported back to DuPont that improved adhesion and up to 25 per cent better fatigue resistance were achieved. The new yarn is being made by an entirely new manufacturing process, according to DuPont sources, and has been given the trade name, Type 714 nylon.

Specific characteristics of the yarn are the result of the new process, which is reported to provide greater flexibility and a wider latitude for development of even better nylon tire yarns. With the increase in the company's facilities for its production, total national nylon tire cord production capacity will be large enough to provide reinforcement for all pneumatic tires being made.

Total Figures

During 1960, 50 per cent of all passenger tire replacement sales were nylon corded tires. This figure rose to 56 per cent during the first half of 1961. In replacement truck tires, more than 60 per cent of those shipped during the first half of 1961 were nylon, while about 35 per cent of original equipment truck tires were nylon. These figures represent sizeable gains over sales in 1960.

The first use of nylon as a tire reinforcing material was in 1940 when it was utilized in military equipment. Strength of the nylon then used was about 6 grams per denier. Subsequent improvements have raised the strength figure to more than nine grams per denier.

Other Fabrics

According to spokesmen at Firestone, the ideal tire cord must have optimum properties of flexing, tensile strength, stretch, must not grow under heat and distort the tire, and must be capable of being bonded to rubber. Numerous synthetic fibers have been researched to achieve these optimum properties.

Among the new materials, polyester fabric (Dacron) and polyvinyl alcohol are two that have received more than passing attention. Polyvinyl alcohol is now being used in Japan for the manufacture of cords for bicycle tires. Eventually it may find its way into the passenger car and truck tire markets in this country sometime in the future.

(Prices f.o.b. Shipping Points)

Rayon Tire Cord

1100	lb.	.57
1650	lb.	.51
2200	lb.	.50

Nylon Tire Cord

840	lb.	.92
1680	lb.	.92

Rayon Graded Fabric

1100	lb.	.69
1650	lb.	.63½
2200	lb.	.63

Cotton Chafers

8.9 oz. (per square yard)	lb.	.71
9.25 oz. (per square yard)	lb.	.72
11.65 oz. (per square yard)	lb.	.66
14.4 oz. (per square yard)	lb.	.75

Liquid Latex

Natural: The Rubber Manufacturers Association reports that in the first nine months of the current year, a total of 30,803 long tons of natural rubber latex were imported into the United States and 31,123 long tons were consumed. This compares with 40,126 long tons, and 38,003 long tons, respectively, in the first nine months of last year.

With three-fourths of the year gone, it seems evident that consumption of natural rubber latex in the United States will not readily rise above a 40,000 long ton level, or about 10,000 long tons less than in 1960. This decline parallels the decline in consumption of all other types of rubber and can be attributed to two factors.

On the one hand, the general economy has been less than at a peak, and on the other, it seems that the over-all markets for latex are on the decline, with the competition from synthetics evident in some areas.

Latex is currently selling at a 35-36c per pound level at East Coast ports in carload lots. Historically this is an attractive price since it is below the traditional "resistance point" of 40c. However, natural latex has been selling for less than 40c since May, and there has been little increase in consumption.

Synthetic: The synthetic rubber latex segment continues to do well within the framework of the generally lower economy. Statistically, synthetic latex has suffered only to the extent that the rest of the rubber industry has suffered. Prices remain basically stable.

Cotton

The price of middling uplands on the New York Cotton Exchange moved in the extremely narrow range of 15 points since our last report (September 29), high for the period being 35.65 reached on October 13, and continuing at that level for the remaining trading days of the month. The low of 35.50 was reached on October 2, 3, and 4, with a gradual slope upward to the plateau. The average price of middling uplands for the month of October was 35.61c based on 22 trading days. This compares with an average of 35.36c during September.

The International Cotton Advisory Committee reports that world-wide production of raw cotton amounted to 47,400,000 bales last season (through July 31) an increase of less than 300,000 bales compared with the previous year 1959-1960. American cotton output represented 30 per cent of this world total, continuing the declining percentage-of-total of recent years. It amounted to 14,353,000 bales, a decrease of 1 per cent from the previous season. The slight production decline in 1961 occurred primarily because of a lower yield per harvested acre, and despite a larger acreage.

Augmenting this production was a carryover of 7,560,000 bales from earlier years. These major supply components, to which are added net imports of foreign cotton at 135,000 bales, resulted in a total available supply of 22,111,000 bales.

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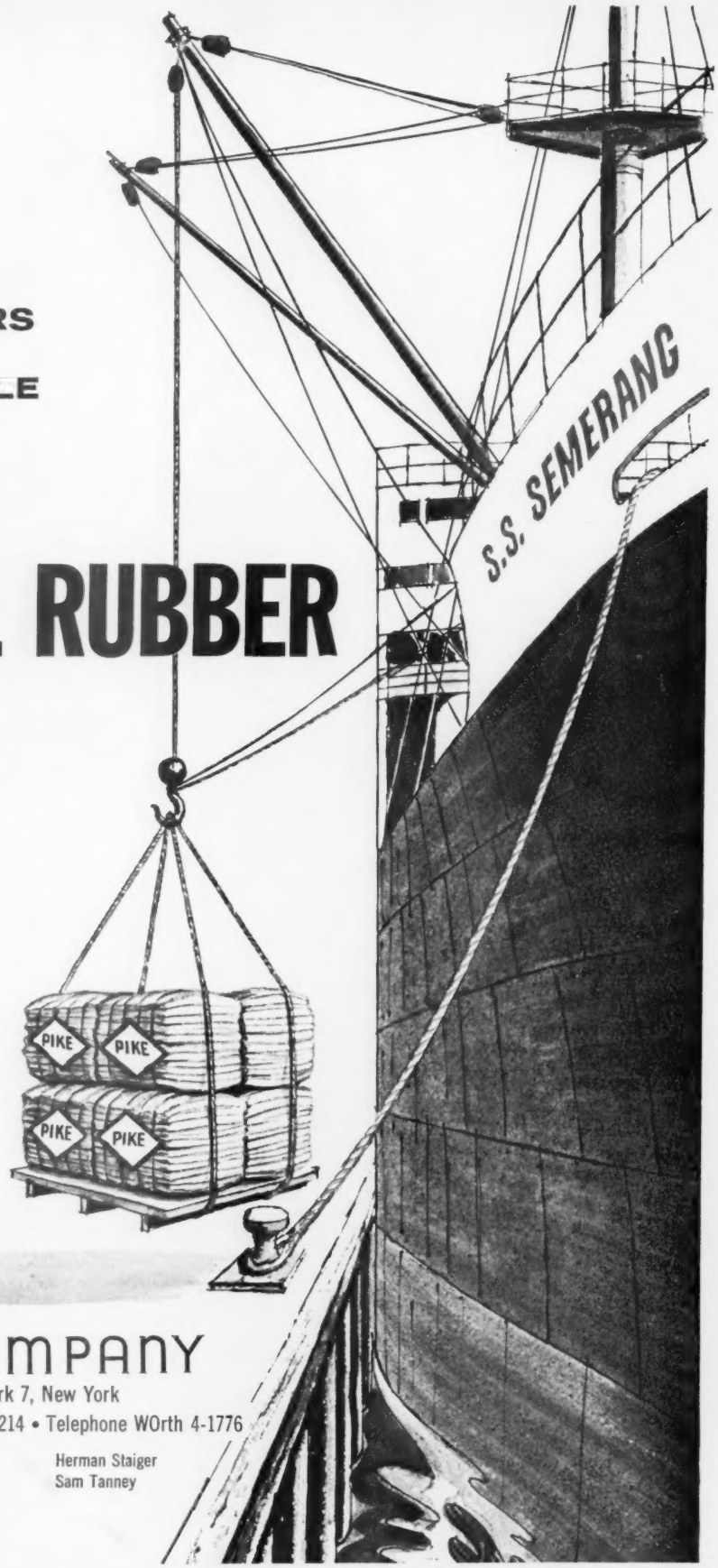

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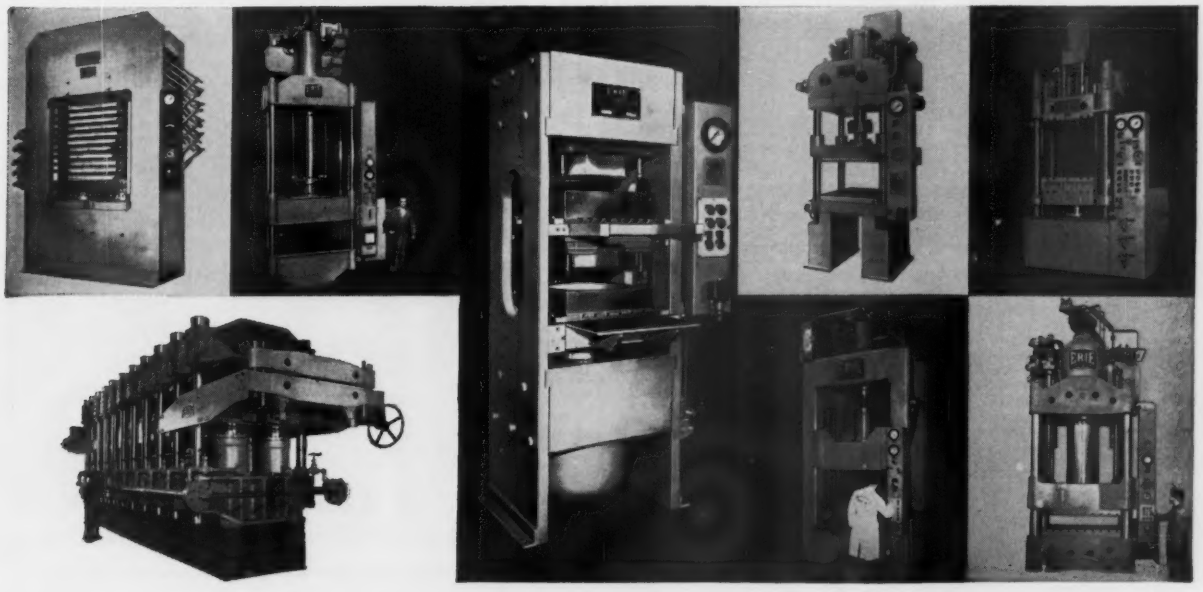

STATISTICS of the industry

PERTINENT INDUSTRY DATA

Natural Rubber in the United States

(Including Latex and Guayule)

(All Quantities in Long Tons)

Year	New Supply	Consumption	Re-Exports	Stocks On Hand at End of Period
1942	282,653	376,791	10,856	422,714
1943	55,329	317,634	20,815	139,594
1944	107,834	144,113	9,665	93,650
1945	135,672	105,429	6,743	118,715
1946	400,687	277,597	4,338	237,467
1947	688,354	562,661	4,101	129,038
1948	735,227	627,332	6,673	141,541
1949	660,792	574,522	6,253	106,619
1950	802,249	720,268	8,644	89,215
1951	733,048	454,015	2,603	76,569
1952	805,997	453,846	3,024	95,260
1953	647,150	553,477	8,376	112,316
1954	596,848	596,285	7,443	104,543
1955	635,174	634,800	10,611	110,105
1956	580,510	563,095	11,300	115,949
1957	499,121	539,761	10,146	100,901
1958	474,409	484,492	20,085	76,491
1959	526,048	555,044	18,750	79,405
1960	410,640	479,598	12,409	77,525
1960:				
Jan.	34,795	46,354	1,373	76,156
Feb.	40,949	46,022	1,448	75,320
Mar.	38,580	47,205	1,522	81,599
Apr.	36,344	42,032	803	83,451
May	32,018	41,263	840	82,693
June	31,639	42,576	509	76,605
July	28,555	35,229	1,488	76,389
Aug.	39,596	37,258	912	82,385
Sept.	31,862	36,770	754	82,227
Oct.	24,594	26,312	1,150	76,116
Nov.	30,411	40,965	1,177	71,608
Dec.	39,084	31,891	593	77,525
1961:				
Jan.	33,750	35,149	650	80,238
Feb.	24,682	31,871	437	76,412
Mar.	29,946	34,908	360	72,360
Apr.	26,123	33,207	442	69,019
May	33,266	35,284	470	63,397
June	2,786	35,876	—	67,873

Source: U. S. Department of Commerce.

U. S. Imports of Natural Rubber

Year	Dry: Long Tons	Dry: Declared Value	Latex: Long Tons	Latex: Declared Value	Total Imports
1949	630,808	225,343,624	29,743	14,968,650	660,551
1950	747,109	416,222,598	54,401	41,764,486	801,510
1951	677,874	727,343,348	54,963	80,178,309	732,837
1952	756,987	578,179,519	48,228	40,563,116	805,215
1953	571,635	284,909,223	75,511	46,353,333	647,146
1954	522,364	219,098,143	74,483	42,755,029	596,847
1955	542,507	360,435,303	92,825	80,163,114	635,332
1956	499,479	334,990,045	71,709	61,795,844	564,321
1957	475,958	291,337,628	78,567	58,249,788	554,174
1958	406,059	153,127,066	67,593	45,047,040	473,652
1959	498,749	304,594,223	79,205	60,939,662	577,954
1960	357,071	278,318,969	49,653	43,964,341	406,724
1960:					
May	26,637	21,962,099	5,830	4,853,091	32,467
June	28,304	23,661,317	3,335	3,152,266	31,639
July	25,072	21,637,414	3,483	3,335,694	28,555
Aug.	35,423	28,919,412	4,174	3,825,191	39,597
Sept.	24,848	23,321,841	2,541	2,259,381	27,389
Oct.	24,866	17,985,313	2,042	1,615,488	26,908
Nov.	26,955	17,654,645	3,456	2,786,602	30,411
Dec.	35,513	21,371,539	3,572	2,685,181	39,085
1961:					
Jan.	28,990	16,356,186	4,761	3,539,388	33,751
Feb.	22,047	11,670,555	4,719	3,677,336	26,766
Mar.	24,881	13,284,536	3,856	2,547,116	28,737
Apr.	21,554	11,215,884	3,029	2,006,933	24,584
May	27,075	13,573,292	2,796	1,890,123	29,871
June	32,834	16,840,482	2,009	1,393,728	34,843
July	30,426	15,974,387	3,816	2,629,223	34,242

Source: Bureau of the Census, U. S. Department of Commerce.

World Production of Natural Rubber

(Including Latex)

(Long Tons)

Year	Malaya	Indonesia	Ceylon	Viet Nam & Cambodia	Latin America*	Rest of World*	Total*
1954	586,480	744,368	93,935	78,024	27,909	270,288	1,810,000
1955	638,748	737,088	93,830	92,657	27,283	327,894	1,917,500
1956	625,972	686,667	93,389	100,698	29,696	351,078	1,887,500
1957	637,537	684,515	98,164	99,739	29,957	352,588	1,902,500
1958	662,872	667,561	100,196	103,613	26,268	396,990	1,957,500
1959	697,766	693,487	91,695	108,107	28,109	420,836	2,040,000
1960	710,485	629,808	97,277	111,924	29,733	423,273	2,002,500
1960:							
Sept.	61,786	53,050	6,502	10,055	600	40,507	172,500
Oct.	63,109	54,153	9,121	10,587	600	34,930	172,500
Nov.	56,883	35,676	6,880	13,981	600	35,980	150,000
Dec.	66,902	71,304	13,153	14,853	600	38,188	205,000
1961:							
Jan.	67,475	34,891	10,251	12,707	2,895	29,281	157,500
Feb.	56,733	45,598	5,384	3,102	3,191	33,492	152,500
Mar.	51,480	62,913	8,494	1,900	3,491	39,222	167,500
Apr.	48,635	71,876	7,913	6,307	3,152	45,269	170,000
May	57,312	57,256	5,545	10,947	2,600	37,940	165,000

Source: International Rubber Study Group. * Estimated.

World Consumption of Natural and Synthetic Rubber

(Including Latex)

(Long Tons)

Year	United States	United Kingdom	Canada	Europe*	Rest of World*	Total*
1953	1,338,309	224,453	73,394	521,000	343,606	2,527,500
1954	1,233,012	253,000	71,656	544,250	408,094	2,520,000
1955	1,529,699	268,600	84,528	630,000	464,250	2,945,000
1956	1,436,482	239,800	91,458	775,500	489,215	3,042,500
1957	1,464,640	244,500	88,379	777,250	565,710	3,155,000
1958	1,364,404	245,900	83,904	905,000	638,353	3,235,000
1959	1,627,770	262,300	101,484	985,250	689,741	3,692,500
1960	1,558,293	291,000	91,035	1,095,250	789,422	3,815,000
1960:						
Sept.	124,100	25,800	7,940	95,750	61,438	317,500
Oct.	125,817	25,800	7,238	100,500	57,443	315,000
Nov.	122,144	25,600	8,190	97,500	61,583	312,500
Dec.	111,967	21,000	6,925	94,750	55,634	292,500
1961:						
Jan.	121,350	23,600	6,872	102,250	68,428	322,500
Feb.	109,604	21,200	6,689	100,250	57,257	295,000
Mar.	120,916	24,200	7,438	109,000	62,946	322,500
Apr.	116,020	21,800	7,421	100,750	59,009	305,000
May	125,848	24,700	8,076	110,250	61,126	330,000

Source: International Rubber Study Group. * Estimated.

Rim Production

	1956	1957	1958	1959	1960
Passenger Car	27,109,610	27,301,567	20,665,688	25,412,177	29,288,767
Truck & Bus	6,315,428	5,468,223	3,887,910	5,019,261	4,874,401
Agricultural	1,416,938	1,368,127	1,218,240	1,386,866	827,945
Earth Mover	88,812	67,289	61,883	111,077	93,971
Total	34,930,788	34,205,206	25,833,721	31,929,381	35,091,084

	1961					
	Apr.	May	June	July	August	Sept.
Passenger Car	1,519,253	2,256,602	2,155,710	1,303,277	1,621,578	2,118,761
Truck and Bus	231,855	311,624	363,898	333,252	322,231	357,682
Agriculture	95,820	104,694	81,063	23,712	45,343	46,766
Earth Mover	5,505	8,578	10,998	5,786	8,086	5,117
Total	1,852,433	2,681,498	2,611,669	1,666,027	1,997,238	2,598,326

Source: The Tire & Rim Association, Inc.

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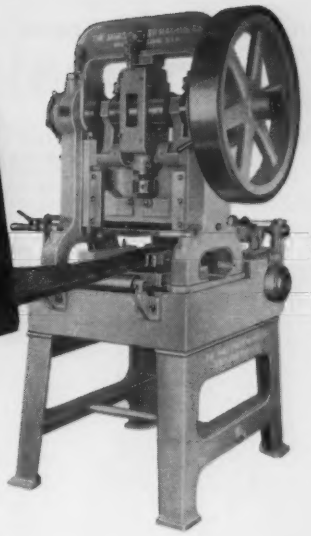
Cutting Rubber Economically ... Since 1896



MODEL A2
Precision cutting for multiple heels, half and full soles with stock grain.

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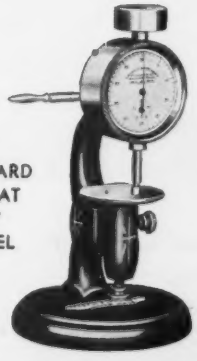

STANDARD THROAT 1¾" MODEL

THROAT DEPTHS
1¾" to 26"
FOOT TENSIONS
supplied by Internal Spring or Direct Weights
FOOT DIAMETERS
⅛" to 1¼"
ROLLS
Table and Roll or two Rolls
RANGE
½" or 1", also 1 CM Metric

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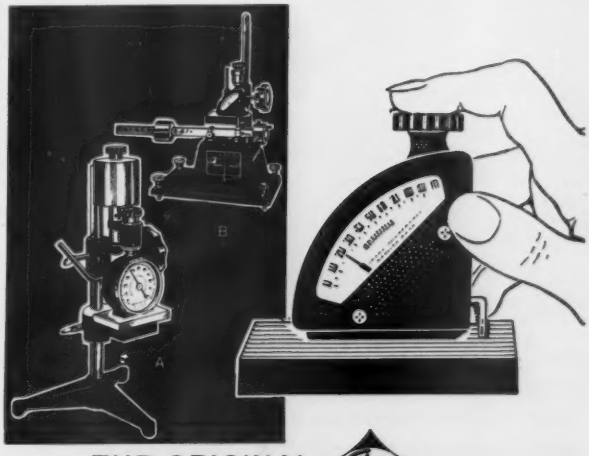

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Since 1915 the international standard for testing the hardness of rubber and rubber-like materials including plastics, both elastomeric and semi-rigid.

FEATURES

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- May be used on Operating Stand "A" with or without DEAD WEIGHT to insure reproducible readings.
- The Durocalibrator "B" is for field use in calibrating and verifying the accuracy of Shore Durometers.

Shore **INSTRUMENT & MFG. CO., INC.**
90-35 VAN WYCK EXPRESSWAY
JAMAICA 35, NEW YORK

Synthetic Rubber in the United States

(All Quantities in Long Tons)

New Supply

Year	GR-S	Neoprene	Butyl	N-Type	Total
1957	**913,321**	**110,721**	**67,418**	**33,618**	**1,125,078**
1958	**872,565**	**97,806**	**54,113**	**32,431**	**1,056,915**
1959	**1,134,379**	**124,815**	**82,704**	**43,588**	**1,385,486**
1960	1,172,006	134,442	100,684	38,405	1,445,539
1960:					
June	99,175	11,614	9,723	2,891	123,403
July	95,892	10,210	8,484	2,519	117,105
Aug.	99,213	10,120	9,999	3,247	122,579
Sept.	90,607	10,078	9,406	3,211	113,302
Oct.	88,451	11,219	8,906	3,226	111,802
Nov.	87,938	11,261	8,605	3,327	111,131
Dec.	86,628	11,291	4,232	3,194	105,345
1961:					
Jan.	85,025	11,896	6,316	3,272	106,509
Feb.	79,892	10,344	7,875	3,134	101,245
Mar.	90,418	10,073	9,783	3,289	113,563
Apr.	88,346	8,776	8,686	3,560	109,368
May	90,582	8,871	7,850	3,614	110,917
June	85,788	8,547	5,717	3,289	108,443
July	89,301	8,267	7,991	2,911	111,852
Aug.	93,824	8,279	6,312	3,172	114,936

Consumption

1958	**730,196**	**69,694**	**53,432**	**26,590**	**880,912**
1959	**886,275**	**84,955**	**65,454**	**34,638**	**1,071,322**
1960	900,495	81,055	62,345	30,875	1,074,770
1960:					
June	80,951	7,129	5,150	2,619	95,849
July	67,853	4,936	4,597	2,027	79,413
Aug.	73,761	7,200	4,880	2,737	88,578
Sept.	72,593	7,096	4,901	2,740	87,330
Oct.	74,606	6,920	4,552	2,706	88,784
Nov.	72,702	6,372	4,455	2,650	86,179
Dec.	67,549	5,983	4,229	2,315	80,076
1961:					
Jan.	71,653	6,345	5,143	2,591	85,732
Feb.	64,710	5,802	4,544	2,121	77,177
Mar.	71,110	6,592	5,005	2,559	85,266
Apr.	68,287	6,101	4,653	2,743	81,784
May	74,188	6,563	5,142	3,067	88,960
June	75,587	7,088	5,117	3,134	92,712
July	64,383	5,180	4,797	2,334	78,358
Aug.	78,955	7,324	5,518	3,015	97,400

Exports

1958	**142,069**	**31,337**	**13,793**	**6,718**	**193,917**
1959	**211,300**	**39,551**	**21,700**	**8,256**	**280,843**
1960	257,027	47,580	29,649	7,699	341,955
1960:					
June	23,130	3,699	2,062	464	29,355
July	19,721	4,446	3,792	616	28,575
Aug.	22,753	3,519	3,494	501	30,267
Sept.	16,836	3,340	3,500	389	24,065
Oct.	15,439	3,913	2,922	629	22,903
Nov.	17,792	2,760	1,928	546	23,026
Dec.	17,415	2,775	2,282	759	23,231
1961:					
Jan.	18,180	5,047	2,275	545	26,045
Feb.	18,949	4,010	2,423	785	26,167
Mar.	19,415	4,471	2,933	649	27,468
Apr.	18,795	2,548	1,075	708	23,126
May	17,220	3,415	1,304	681	22,938
June	15,285	2,502	1,117	693	20,130
July	16,039	2,887	1,592	753	21,919

Stocks

1957	**140,199**	**18,843**	**31,489**	**7,454**	**197,985**
1958	**143,533**	**15,688**	**18,770**	**7,292**	**185,283**
1959	**174,606**	**14,164**	**13,188**	**8,888**	**210,846**
1960	192,199	19,734	23,485	6,998	242,416
1960:					
June	183,996	15,411	18,912	7,713	226,032
July	192,552	16,954	18,689	7,498	235,693
Aug.	198,695	16,072	20,877	7,096	242,740
Sept.	198,067	16,590	21,271	7,031	242,959
Oct.	192,090	16,405	23,205	6,891	238,591
Nov.	189,466	18,056	25,594	6,922	240,038
Dec.	192,199	19,734	23,485	6,998	242,416
1961:					
Jan.	186,626	19,865	23,035	6,721	236,247
Feb.	181,556	21,707	22,783	6,990	233,036
Mar.	180,355	21,941	26,212	7,119	235,627
Apr.	183,353	21,314	29,504	7,749	241,920
May	178,761	20,510	31,627	7,811	238,709
June	172,919	19,755	31,189	7,566	243,167
July	181,130	19,676	32,755	8,238	253,444
Aug.	172,345	17,738	31,169	7,473	239,840

Source: U. S. Department of Commerce.

Natural and Synthetic Rubber Latex in the United States

(All Quantities in Long Tons)

New Supply

Year	Natural	GR-S	Neoprene	N-Type	Total Synthetic	Grand Total
1955	**92,754**	**69,364**	**10,432**	**10,798**	**90,594**	**183,348**
1956	**72,013**	**69,720**	**10,642**	**10,650**	**91,012**	**163,025**
1957	**72,252**	**74,535**	**10,403**	**11,420**	**96,358**	**168,610**
1958	**67,591**	**65,669**	**10,679**	**11,560**	**87,908**	**155,499**
1959	**72,502**	**93,303**	**13,127**	**14,034**	**120,464**	**192,966**
1960	49,196	101,220	12,746	13,418	127,384	176,580
1960:						
May	5,380	8,162	1,250	1,009	10,421	15,801
June	3,335	7,541	965	973	9,479	12,814
July	3,483	6,481	953	983	8,417	11,900
Aug.	4,174	8,096	978	1,291	10,365	14,539
Sept.	2,541	9,397	1,119	1,299	11,815	14,356
Oct.	2,042	9,063	1,272	1,176	11,511	13,553
Nov.	3,456	7,205	1,169	1,328	9,702	13,158
Dec.	3,572	6,934	660	996	8,590	12,162
1961:						
Jan.	4,761	7,821	853	1,174	9,848	14,609
Feb.	3,506	6,286	817	966	8,669	11,575
Mar.	3,855	8,500	1,205	763	10,468	14,323
Apr.	3,029	7,703	1,167	1,008	9,878	12,907
May	2,796	8,614	729	1,095	10,438	13,234
June	2,009	8,314	954	1,090	10,358	12,367
July	3,816	5,626	1,000	782	7,408	11,224
Aug	....	8,911	908	1,040	10,859	10,859

Consumption[1]

1956	**74,082**	**62,762**	**8,708**	**8,021**	**79,491**	**153,573**
1957	**75,009**	**68,305**	**9,039**	**8,630**	**85,974**	**160,983**
1958	**70,183**	**60,283**	**9,555**	**10,549**	**80,387**	**150,570**
1959	71,745	80,646	11,394	13,258	105,298	177,043
1960	50,898	87,457	11,221	12,079	110,757	161,655
1960:						
May	3,655	6,821	868	978	8,667	12,322
June	3,975	7,147	1,033	981	9,161	13,136
July	2,912	5,433	729	780	6,942	9,854
Aug.	3,897	7,857	1,057	1,078	9,992	13,889
Sept.	4,250	7,458	942	1,122	9,522	13,772
Oct.	4,283	7,371	971	1,118	9,460	13,743
Nov.	4,338	7,171	914	1,104	9,189	13,527
Dec.	3,588	6,756	750	898	8,404	11,992
1961:						
Jan.	3,525	6,667	779	1,005	8,451	11,976
Feb.	3,298	6,303	727	713	7,743	11,041
Mar.	3,575	6,866	936	904	8,706	12,281
Apr.	3,413	6,529	864	1,130	8,523	11,936
May	3,473	6,971	911	1,113	8,995	12,468
June	3,804	7,308	1,100	1,233	9,641	13,445
July	2,594	5,367	641	842	6,850	9,444
Aug.	3,881	7,420	990	1,035	9,445	13,326

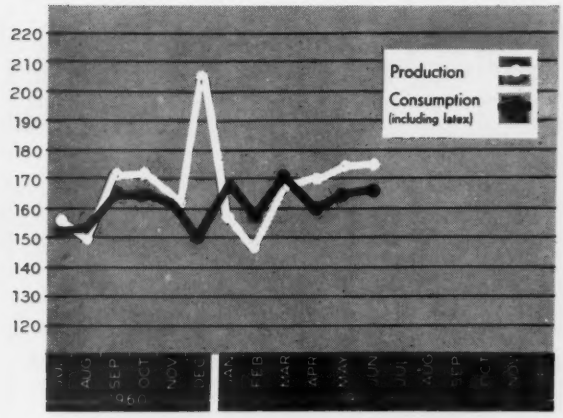
Stocks at End of Period

1956	**12,064**	**7,451**	**1,384**	**1,558**	**10,393**	**22,457**
1957	**14,454**	**8,347**	**1,267**	**1,974**	**11,588**	**26,042**
1958	**8,900**	**7,672**	**1,663**	**2,519**	**11,854**	**20,754**
1959	**12,717**	**8,226**	**1,581**	**2,883**	**12,690**	**25,067**
1960	9,225	9,204	1,665	2,242	13,111	22,336
1960:						
May	15,214	10,031	1,745	2,342	14,118	29,332
June	14,140	9,142	1,530	1,941	12,613	26,753
July	14,785	9,364	1,564	2,064	12,992	27,777
Aug.	13,690	8,641	1,333	1,967	11,941	25,631
Sept.	12,852	9,172	1,494	2,034	12,700	25,552
Oct.	10,634	10,000	1,626	1,999	13,625	24,259
Nov.	9,284	9,180	1,798	2,300	13,278	22,562
Dec.	9,225	9,204	1,665	2,242	13,111	22,336
1961:						
Jan.	9,866	9,395	1,582	2,128	13,105	22,971
Feb.	10,280	8,801	1,508	2,247	12,556	22,836
Mar.	10,318	9,254	1,927	2,124	13,305	23,623
Apr.	9,404	8,643	2,058	2,271	12,972	22,376
May	8,535	9,510	1,652	2,254	13,416	21,951
June	7,508	10,272	1,407	2,115	13,794	21,302
July	8,040	9,248	1,700	2,471	13,419	21,459
Aug.	7,294	9,497	1,402	2,339	13,238	20,532

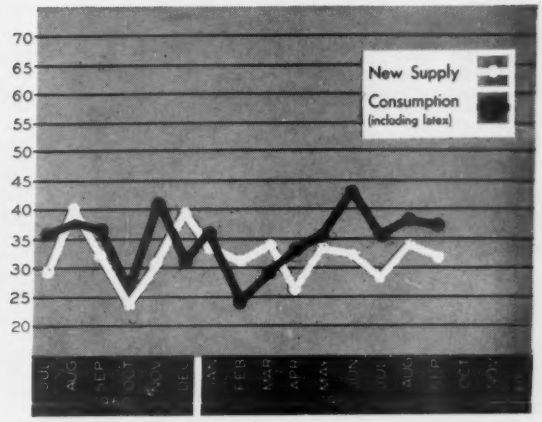
Source: U. S. Department of Commerce.
Note: (1) GR-S and Neoprene consumption estimated through 1950.

STATISTICS at a glance

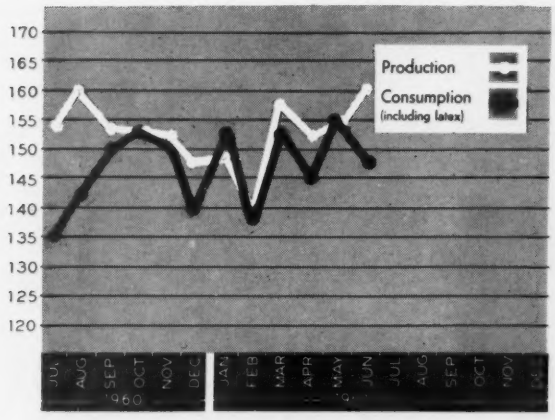
NATURAL RUBBER—WORLD
(thousands of long tons)



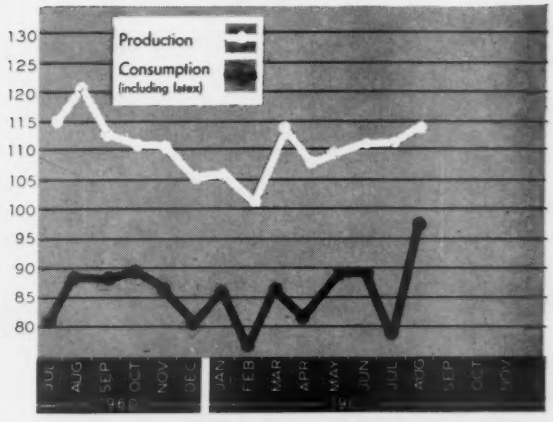
NATURAL RUBBER—UNITED STATES
(thousands of long tons)



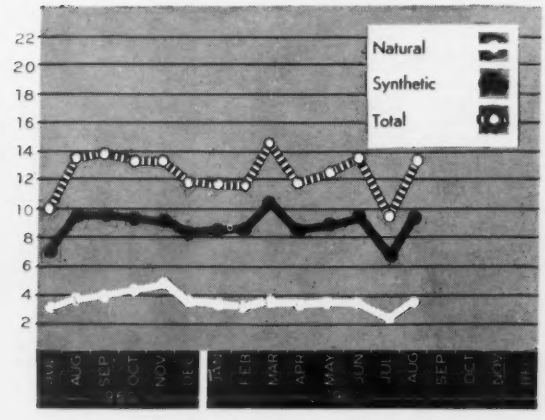
SYNTHETIC RUBBER—WORLD
(thousands of long tons)



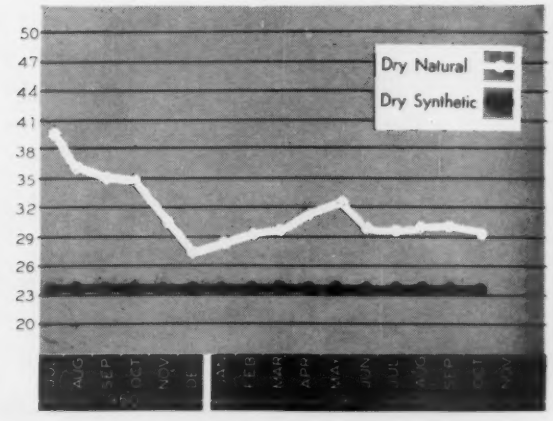
SYNTHETIC RUBBER—UNITED STATES
(thousands of long tons)



LATEX CONSUMPTION—UNITED STATES
(thousands of long tons)



PRICES—NATURAL AND SYNTHETIC
(cents per pound)



Automotive Pneumatic Casings

(Thousands of Units)

	Shipments					
	Original Equipment	Replacement	Export	Total	Production	Inventory End of Period
1954 (total)	33,333	55,155	1,753	90,241	89,141	14,762
Passenger Car.	29,741	47,044	928	77,713	76,794	12,217
Truck and Bus	3,591	8,111	826	12,528	12,347	2,545
1955 (total)	47,374	59,246	1,879	108,499	112,178	18,778
Passenger Car.	42,574	50,189	966	93,730	97,223	15,963
Truck and Bus	4,800	9,057	912	14,769	14,955	2,815
1956 (total)	35,422	62,146	1,757	99,325	100,406	79,872
Passenger Car.	30,873	53,252	875	85,000	85,546	16,494
Truck and Bus	4,548	8,894	883	14,325	14,859	3,378
1957 (total) ...	36,765	65,150	1,733	103,649	106,940	250,536
Passenger Car.	32,725	56,603	889	90,217	93,542	210,146
Truck and Bus	4,053	8,546	846	13,432	13,398	40,384
1958 (total)	26,783	70,797	1,348	98,928	96,563	20,939
Passenger Car.	23,408	61,570	717	85,696	83,636	17,778
Truck and Bus	3,375	9,226	631	13,232	12,927	3,161
1959 (total)	34,163	76,812	1,430	112,405	117,875	26,933
Passenger Car..	29,746	66,797	786	97,329	102,637	23,578
Truck and Bus	4,417	10,015	644	15,076	15,238	3,355
1960 (total)	40,205	77,785	1,722	119,712	119,844	27,540
Passenger Car .	36,320	68,535	943	105,799	105,361	23,583
Truck and Bus	3,885	9,250	777	13,912	14,482	3,957
1960:						
Sept. (total)	2,950	6.560	120	9,630	9,184	25,893
Passenger Car.	2,676	5,749	59	8,484	8,158	22,037
Truck and Bus	273	811	61	1,146	1,026	3,856
Oct. (total)	3,589	6,304	121	10,014	9,530	25,499
Passenger Car.	3,342	5,366	53	8,760	8,461	21,816
Truck and Bus	247	938	62	1,254	1,069	3,683
Nov. (total)	3,425	4,772	105	8,303	9,044	26,290
Passenger Car.	3,171	4,123	55	7,348	7,979	22,493
Truck and Bus	255	649	51	955	1,066	3,797
Dec. (total)	3,087	4,464	112	7,663	8,804	27,541
Passenger Car.	2,844	3,912	55	6,812	7,809	23,583
Truck and Bus	243	552	56	851	995	3,957
1961:						
Jan. (total)	2,449	6,590	91	9,130	9,221	27,682
Passenger Car.	2,191	5,955	44	8,189	8,234	23,691
Truck and Bus	258	635	48	941	988	3,991
Feb. (total)	2,191	4,720	92	7,002	8,589	29,338
Passenger Car.	1,930	4,150	43	6,123	7,641	25,268
Truck and Bus	261	569	49	879	948	4,070
Mar. (total)	2,448	6,595	123	9,166	9,212	29,385
Passenger Car.	2,134	5,876	72	8,082	8,196	25,385
Truck and Bus	313	719	52	1,084	1,016	4,000
Apr. (total)	2,934	7,202	96	10,232	8,882	28,033
Passenger Car.	2,602	6,444	54	9,100	7,866	24,150
Truck and Bus	332	758	43	1,133	1,017	3,883
May (total)	3,377	7,716	99	11,192	9,604	26,503
Passenger Car.	3,031	6,944	57	10,032	8,501	22,669
Truck and Bus	346	772	42	1,160	1,103	3,843
June (total)	3,123	8,473	113	11,709	9,920	24,801
Passenger Car.	2,791	7,524	73	10,388	8,803	21,157
Truck and Bus	332	949	40	1,322	1,117	3,644
July (total)	2,023	7,490	84	9,598	8,881	24,098
Passenger Car.	1,765	6,688	43	8,496	7,836	20,525
Truck and Bus	258	802	41	1,102	1,045	3,573
Aug. (total)	1,928	8,215	126	10,269	10,345	24,127
Passenger Car.	1,657	7,266	80	9,002	9,203	20,681
Truck and Bus	271	950	46	1,267	1,142	3,445

Source: The Rubber Manufacturers Association, Inc.

Automobile Production in U. S.

(Civilian Production Only)

Year	Passenger Cars	Trucks	Total	Year	Passenger Cars	Trucks	Total
1941	3,744,500	875,381	4,619,681	1951	5,337,729	1,420,432	6,758,161
1942	220,814	133,083	353,897	1952	4,320,794	1,212,790	5,533,584
1943	0	4,501	4,501	1953	6,121,787	1,202,196	7,323,983
1944	0	124,819	124,819	1954	5,558,897	1,038,045	6,596,942
1945	83,792	313,643	397,435	1955	7,920,186	1,245,018	9,165,204
1946	2,148,699	930,760	3,079,429	1956	5,816,109	1,100,417	6,916,526
1947	3,558,178	1,220,634	4,778,812	1957	6,113,344	1,097,006	7,210,350
1948	3,909,270	1,363,856	5,132,090	1958	4,257,812	874,278	5,132,090
1949	5,108,841	1,123,736	6,232,577	1959	5,591,243	1,134,858	6,726,101
1950	6,665,836	1,332,263	7,998,099	1960	6,674,796	1,193,769	7,860,565
1960:							
Jan.	676,712	115,268	791,980	July	421,355	79,444	500,799
Feb.	656,579	125,938	782,517	Aug.	324,020	65,948	389,968
Mar.	659,730	131,169	780,899	Sept.	386,694	77,038	463,732
Apr.	588,046	114,590	702,636	Oct.	627,678	75,034	702,712
May	607,191	118,023	727,214	Nov.	600,495	86,957	687,452
June	605,582	111,420	717,002	Dec.	520,714	92,940	613,654
1961:							
Jan.	406,616	79,039	485,655	July	407,339	90,311	497,650
Feb.	363,193	84,821	448,014	Aug.	172,754	70,422	243,176
Mar.	425,892	99,909	525,801	Sept.	——	——	——
Apr.	453,425	93,858	547,283	Oct.	——	——	——
May	539,858	101,406	641,264	Nov.	——	——	——
June	567,563	113,824	671,387	Dec.	——	——	——

Source: Automobile Manufacturers Association.
Note: Figures are based on factory sales. Revisions are made from time to time in these figures and the latest issue should be consulted for accuracy.

Automotive Inner Tubes

(Thousands of Units)

Year	Shipments: Original Equipment	Shipments: Replacement	Shipments: Export	Shipments: Total	Production	Inventory End of Period
1954	25,071	35,576	945	61,593	48,279	9,519
1955	5,001	33,387	1,001	39,389	35,900	6,833
1956	3,100	32,358	1,040	36,498	34,405	6,109
1957	3,046	35,687	1,076	39,806	39,774	80,077
1958	2.678	37.872	870	41.420	41,266	8,602
1959	3,624	41,522	891	46,037	46,059	10,536
1960	3,349	36,324	1,120	40,793	40,980	11,034
1960:						
May	307	2,932	91	3,330	3,611	10,852
June	295	3.154	98	3,547	3,444	10,700
July	242	3,103	94	3,440	3,261	10,627
Aug.	169	3,056	83	3,308	3,017	10,254
Sept.	232	2,563	100	2,894	3,024	10,446
Oct.	222	2,666	111	3,000	3,067	10,589
Nov.	229	2,354	74	2,657	2,921	10,859
Dec.	224	2,499	95	2,818	2,913	11,034
1961:						
Jan.	237	4,783	56	5,076	3,208	9,394
Feb.	231	2,987	58	3,276	3,140	9,246
Mar.	281	3,246	60	3,588	3,359	9,014
Apr.	299	2,533	70	2,902	2,939	9,096
May	306	2,424	65	2,795	3,190	9,487
June	297	2,970	57	3,323	2,838	8,948
July	224	2,777	45	3,046	2,733	8,641
Aug.	225	2,909	57	3,192	3,211	8,700

Source: The Rubber Manufacturers Association, Inc.

Vinyl and Vinyl Copolymer Resins—Sales

(Thousands of Pounds—Resin Content)

	Polyvinyl Chloride and Copolymer Resins: Film	Sheeting	Molding & Extrusion	Textile & Paper Treating	Flooring	Protective Coatings	All Other Uses	All Other Vinyl Resins: Adhesives	All Other Uses	Grand Total
1956	78,063	55,598	206,726	62,931	65,384	28,522	71,859	36,565	115,151	720,799
1957	90,543	56,344	216,517	66,392	81,357	31,519	50,637	41,665	113,396	748,370
1958	72,404	67,594	214,701	63,050	113,583	28,913	68,307	52,904	117,752	801,208
1959	85,136	125,639	304,711	64,703	151,840	31,371	94,418	57,599	159,528	1,074,945
1960	98,917	126,881	284,520	62,452	161,106	38,577	112,415	59,105	151,857	1,105,380
1961:										
Jan.	7,311	10,615	23,417	5,150	12,866	2,902	7,725	4,501	11,952	86,439
Feb.	7,145	8,878	20,299	4,385	12,603	2,124	8,444	5,064	10,936	79,878
Mar.	8,905	9,036	24,780	4,943	14,887	3,089	11,407	5,683	12,347	95,077
Apr.	7,438	10,135	23,059	5,237	15,575	2,943	11,134	5,187	12,666	93,374
May	8,833	11,397	26,030	5,936	15,346	3,437	10,442	5,817	13,597	100,835
June	8,500	10,911	27,606	6,100	15,258	3,562	9,940	5,722	13,710	101,309
July	6,769	8,868	21,669	4,396	12,827	3,160	8,784	4,857	13,096	84,427
August	7,618	12,420	29,264	6,462	17,811	3,981	11,391	6,035	12,761	107,744

Source: Chemical Division, U. S. Tariff Commission.

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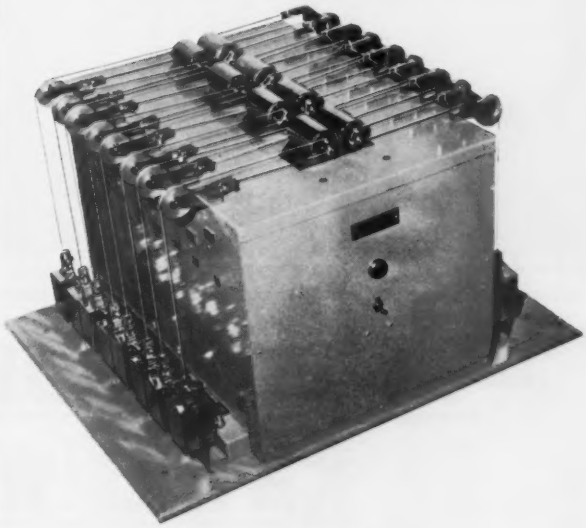

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KENT, OHIO

Export Agents — Columbian Carbon International
New York, N. Y.

Rubber Industry Employment Earnings and Hours

All Rubber Products

Mo.	1960 Production Workers (thousands)	1960 Average Weekly Earnings	1960 Average Weekly Hours	1960 Average Hourly Earnings	1961 Production Workers (thousands)	1961 Average Weekly Earnings	1961 Average Weekly Hours	1961 Average Hourly Earnings
Jan.	208.0	$102.16	40.7	$2.51	187.5	98.81	38.9	2.54
Feb.	208.6	100.00	40.0	2.50	180.8	97.27	38.6	2.52
Mar.	207.5	97.71	39.4	2.48	179.7	97.66	38.6	2.53
Apr.	200.7	94.60	38.3	2.47	180.5	100.47	39.4	2.55
May	197.6	100.04	39.7	2.52	184.3	101.89	39.8	2.56
June	197.9	102.72	40.6	2.53	188.3	103.60	40.0	2.59
July	191.7	103.53	40.6	2.55	188.4	....	...	...
Aug.	196.1	100.15	39.9	2.51	....	....	...	...
Sept.	197.8	98.28	39.0	2.52	....	....	...	...
Oct.	197.9	101.49	39.8	2.55	....	....	...	...
Nov.	192.6	99.57	39.2	2.54	....	....	...	...
Dec.	190.6	99.58	38.9	2.56	....	....	...	...

Tires and Tubes

Jan.	77.9	119.80	40.2	2.98	70.4	113.54	38.1	2.98
Feb.	77.4	117.71	39.5	2.98	66.9	110.78	37.3	2.97
Mar.	78.8	113.68	38.8	2.93	68.1	111.53	37.3	2.99
Apr.	78.1	107.38	36.9	2.91	67.3	115.20	38.4	3.00
May	77.0	117.51	39.7	2.96	67.6	115.58	38.4	3.01
June	76.6	121.39	40.6	2.99	69.0	122.58	39.8	3.08
July	75.9	123.71	41.1	3.01	....	....	...	...
Aug.	75.7	114.66	39.0	2.94	....	....	...	...
Sept.	74.5	112.40	38.1	2.95	....	....	...	...
Oct.	73.8	117.00	39.0	3.00	....	....	...	...
Nov.	73.1	114.60	38.2	3.00	....	....	...	...
Dec.	71.5	118.59	39.4	3.01	....	....	...	...

Rubber Footwear

Jan.	19.0	79.40	39.5	2.01	18.3	82.32	39.2	2.10
Feb.	19.0	77.21	38.8	1.99	18.9	85.60	40.0	2.14
Mar.	18.9	78.61	39.5	1.99	19.1	82.92	39.3	2.11
Apr.	18.5	77.01	38.7	1.99	19.3	86.65	40.3	2.15
May	18.1	81.40	40.1	2.03	19.9	86.24	40.3	2.14
June	18.2	82.82	40.6	2.04	20.1	82.68	39.0	2.12
July	17.6	82.21	40.3	2.04	....	....	...	...
Aug.	18.2	81.40	40.1	2.03	....	....	...	...
Sept.	18.5	79.18	39.2	2.02	....	....	...	...
Oct.	18.5	82.59	39.9	2.07	....	....	...	...
Nov.	17.4	82.16	39.5	2.08	....	....	...	...
Dec.	18.4	79.00	37.8	2.09	....	....	...	...

All Other Rubber Products

Jan.	111.1	93.52	41.2	2.27	98.8	91.01	39.4	2.31
Feb.	112.2	91.76	40.6	2.26	95.0	90.16	39.2	2.30
Mar.	109.8	89.78	39.9	2.25	92.5	90.62	39.4	2.30
Apr.	104.1	88.43	39.3	2.25	93.9	92.80	40.0	2.32
May	102.5	90.12	39.7	2.27	96.8	95.00	40.6	2.34
June	103.1	92.34	40.5	2.28	99.2	94.54	40.4	2.34
July	98.2	91.66	40.2	2.28	....	....	...	...
Aug.	102.2	92.75	40.5	2.29	....	....	...	...
Sept.	104.8	92.10	39.7	2.32	....	....	...	...
Oct.	105.6	93.73	40.4	2.32	....	....	...	...
Nov.	102.1	92.17	39.9	2.31	....	....	...	...
Dec.	100.7	89.40	38.7	2.31	....	....	...	...

Source: U. S. Department of Labor.

Note: Data are based upon reports from cooperating establishments covering both full and part-time employees who work during, or received pay for, any part of the pay period ending nearest the 15th of the month. These employment series have been adjusted to first quarter 1954 benchmark levels indicated by data from government social insurance programs. Hours and earnings data pertain only to production and related workers.

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market—in Cents)

Average Monthly Price Per Pound

	1954	1955	1956	1957	1958	1959	1960	1961
Jan.	34.16	35.07	35.24	34.82	36.31	35.67	33.09	32.25
Feb.	35.00	35.04	36.26	34.82	35.83	35.69	33.20	32.35
Mar.	35.23	34.33	36.70	35.35	36.05	35.71	33.54	33.27
Apr.	35.22	34.23	36.43	35.43	36.00	36.05	34.10	33.62
May	35.34	34.80	36.65	35.40	36.27	36.24	34.15	34.07
June	35.17	34.83	36.67	35.45	36.33	36.05	34.22	34.44
July	35.37	34.61	35.43	35.49	36.51	34.67	33.96	34.82
Aug.	35.19	34.53	34.31	35.15	36.36	33.17	32.59	35.11
Sept.	35.46	33.85	34.35	33.74	36.00	32.99	32.39	35.36
Oct.	35.24	33.93	34.45	35.09	36.23	32.77	32.21	35.61
Nov.	34.80	34.87	34.56	36.06	36.24	32.79	32.27	....
Dec.	35.03	34.95	34.56	36.50	35.75	33.02	31.60	....
Average for Year	35.10	34.59	35.50	35.36	36.16	34.57	33.10	....

Note: The Government established a ceiling of 45.76c for spot cotton on March 3, 1951. (a) Trading suspended during February.

Production Index for the Rubber Industry

(1957 = 100)

(Based on man-hours)

	1959	1960	1961		1959	1960	1961
Jan.	108	118	103	July	128	117	123
Feb.	113	117	102	Aug.	120	115	...
Mar.	112	115	90	Sept.	120	111	...
Apr.	104	115	110	Oct.	116	110	...
May	105	117	114	Nov.	120	109	...
June	117	122	121	Dec.	120	105	...

Sales by the Rubber Industry

(in Millions of Dollars*)

	1959	1960	1961		1959	1960	1961
Jan.	508	530	450	July	519	480	470
Feb.	490	570	460	Aug.	492	480	500
Mar.	506	510	490	Sept.	544	510	...
Apr.	543	530	480	Oct.	555	490	...
May	524	550	500	Nov.	482	500	...
June	520	520	500	Dec.	500	470	...

Rubber Manufacturers' Inventories

(in Millions of Dollars*)

	1959	1960	1961		1959	1960	1961
Jan.	998	1,140	1,130	July	1,075	1,230	1,130
Feb.	1,022	1,140	1,130	Aug.	1,113	1,240	1,130
Mar.	1,030	1,160	1,120	Sept.	1,115	1,200	....
Apr.	1,015	1,190	1,130	Oct.	1,115	1,160	....
May	995	1,180	1,140	Nov.	1,120	1,140	....
June	1,013	1,200	1,130	Dec.	1,140	1,120	....

Source: U. S. Department of Commerce.
Notes: * Adjusted for seasonal variation.

No. 1 R.S.S.—Annual Average Prices

(New York Market—Cents per Pound)

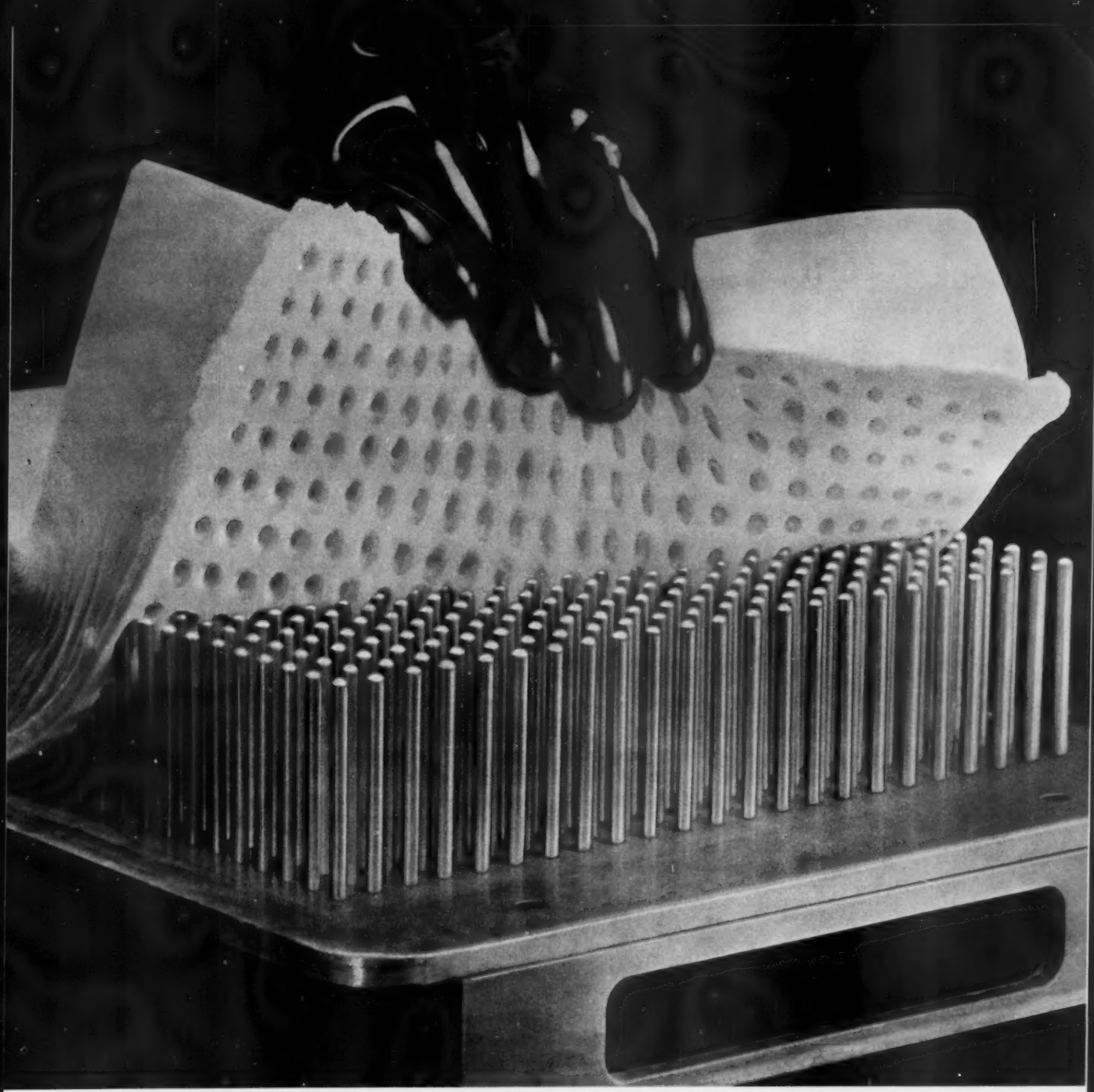
Year	High	Low	Avg.	Year	High	Low	Avg.
1919	57	38½	48.70	1940	24	18¼	20.10
1920	56½	16	36.30	1941	24⅞	19⅛	22.40
1921	21¼	11½	16.36	1942	22½	22½	22.50
1922	28⅜	13⅜	17.50	1943	22½	22½	22.50
1923	37½	24¾	29.45	1944	22½	22½	22.50
1924	40½	17⅜	26.20	1945	22½	22½	22.50
1925	121	34⅜	72.46	1946	22½	22½	22.50
1926	88½	36¾	48.50	1947	25	14	20.00
1927	41¾	33	37.72	1948	25	18	21.99
1928	41¾	17	22.48	1949	19¾	15⅞	17.57
1929	26⅞	15½	20.55	1950	86	18	41.10
1930	16½	7½	11.98	1951	76	52	(a)
1931	8¾	4¼	6.17	1952*	33	26½	29.15
1932	4¾	2½	3.49	1953	31⅞	19⅜	24.21
1933	9⅞	2⅝	5.96	1954	34½	19½	23.61
1934	15⅞	8¾	12.92	1955	52	29⅜	39.16
1935	13¾	10½	12.37	1956	45	26½	34.24
1936	23	13½	16.41	1957	37⅜	26⅜	31.13
1937	26⅞	14	19.39	1958	32⅜	24⅜	28.13
1938	17⅛	10¼	14.64	1959	49	29¾	36.56
1939	24	14⅛	17.57	1960	47½	28⅜	38.09

Note: Price was fixed by Government on August 6, 1941, at 22½c a pound for non-war uses. Free trading was resumed May 1, 1947. (a) Free trading suspended March 31, 1951. GSA selling price ranged between 52 and 66c during balance of year. * Free trading was resumed on July 1, 1952; figures represent only July through December, 1952.

No. 1 R.S.S.—Monthly Average Prices

(New York Market—Cents per pound)

	1954	1955	1956	1957	1958	1959	1960	1961
Jan.	20.22	33.92	41.70	33.32	27.15	30.34	41.18	28.77
Feb.	19.98	34.90	33.68	30.43	26.32	30.26	39.33	29.00
Mar.	20.16	31.08	33.68	31.76	26.65	31.62	40.74	30.22
Apr.	22.06	31.75	31.75	32.23	26.44	33.72	40.35	31.21
May	21.96	31.35	29.61	32.12	25.51	36.48	43.62	32.04
June	23.01	34.74	30.54	32.80	26.20	34.31	45.70	30.04
July	24.12	40.84	33.91	32.88	27.70	35.19	40.90	29.46
Aug.	23.00	48.85	35.69	32.13	28.72	38.43	36.69	30.05
Sept.	23.00	48.27	32.64	29.94	29.49	40.22	35.04	30.22
Oct.	26.57	43.81	32.68	29.24	31.06	41.50	34.06	29.28
Nov.	28.07	44.95	35.18	27.47	32.10	45.16	30.63	....
Dec.	29.88	48.40	37.01	29.25	30.28	41.46	28.81	....
Average for Year	23.61	39.16	34.24	31.13	28.13	36.56	38.09	....



Shell chemist removes CL-104 cushion from pin core mold. Read how this new latex can save you money.

SHELL ANNOUNCES A NEW SBR LATEX

Shell Chemical has developed an SBR latex that increases foam products yield as much as 15 per cent. Read about *new CL-104*—and how it can reduce your foam rubber costs. →

Shell's new CL-104 latex lets you reduce foam density as much as 15 per cent without sacrificing compression resistance

Shell Research has found a way to build greater strength into SBR latex. As a result, foam manufacturers can reduce the amount of rubber required in foam cushioning. Here's what this discovery can do for you.

SHELL CL-104 is a new SBR latex that can save you money. Here's why:

CL-104 is different from ordinary SBR latex. It's *stronger*. So much so, you can reduce the density of your present foam cushions as much as 15 per cent without losing compression resistance or tensile strength.

These facts are important to foam manufacturers. They mean *lower foam costs*. Because you can reduce foam density as much as 15 per cent, you use less rubber. Or, to look at it another way, with Shell CL-104 you can now make up to 15 per cent more cushions from every tank car of synthetic latex you buy.

Expands foam markets

Shell's CL-104 has dramatic possibilities of expanding your foam markets. In addition to lowering your foam costs, it now lets you offer the *comfort* advantages of *rubber latex foam* to consumers of lower-priced foam products.

No processing changes required

You may be wondering if your plant is set up to use Shell CL-104. Or if any elaborate processing changes are necessary.

If you are presently using 2105 type latex, you can start using Shell CL-104 latex today. No special processing changes are needed.

Shell CL-104 froths readily, has equivalent gel time, vulcanizes and strips in the same manner as S-2105. It is compatible with natural latex and S-2105 in any ratio.

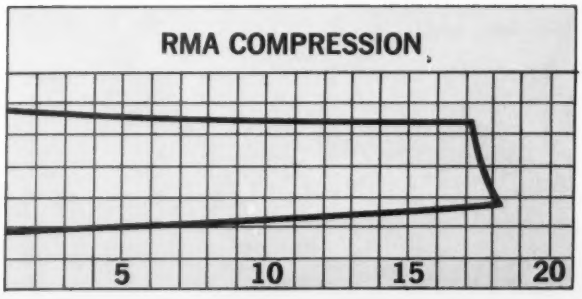
Handles easily

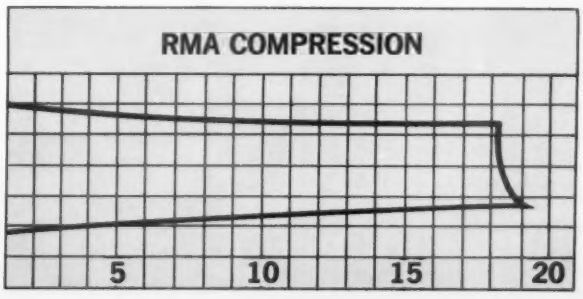
Hundreds of tests in Shell's Torrance laboratories during three years of research confirm its ease of handling in flat stock, standard cushions, and today's new pin core designs.

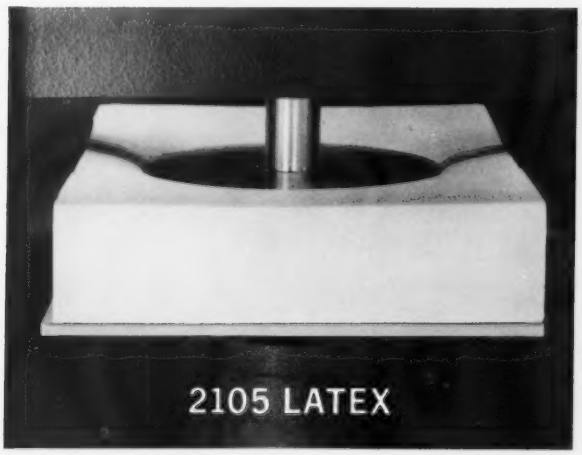
If you would like to try a test run of CL-104 in your own plant, contact your Shell representative. He'll help with all the details, and will show you how to start lowering your rubber latex foam costs.

1. Photo above shows foam cushion made of standard 2105 latex. It weighs 480 grams. Photo below shows 2105 cushion registers RMA compression of 18 pounds at 25 per cent deflection.

2. Photo above shows same size cushion made of Shell CL-104. It weighs 405 grams—15 per cent less than the 2105 cushion. Photo below shows this lower density cushion has almost the same RMA compression.

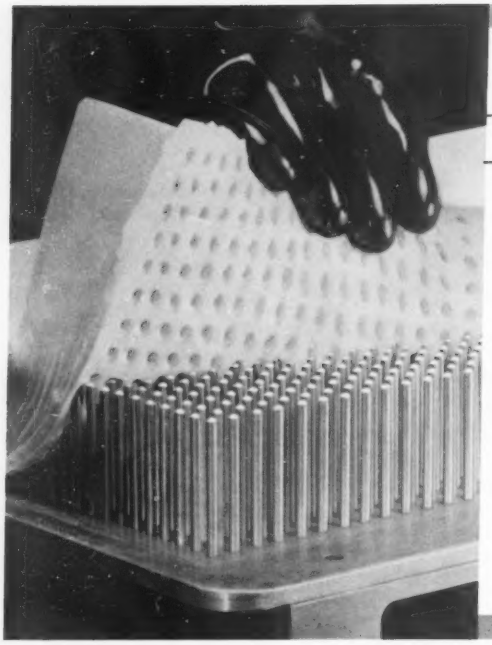






SEE NEXT PAGE FOR PROPERTY CHART AND OTHER DATA ON SHELL CL-104 ⟶

NEW LATEX CONTD.



TYPICAL FOAM PROPERTIES OF NEW SHELL CL-104

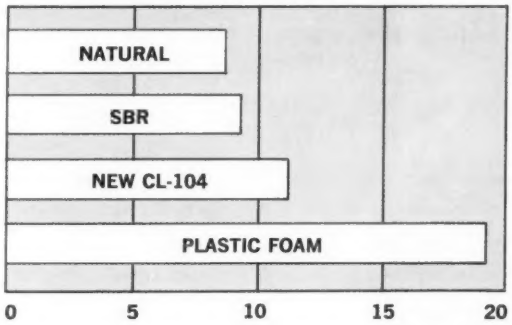
	CL-104	2105
Foam density, lb./cu. ft.	3.8	4.5
RMA compression, lb./50 in.²	18.0	17.5
Tensile Strength, psi	6.0	6.0
Elongation, %	170	200
Hot Wet Tensile Index, psi	3.2	3.0
Hot Wet Elongation, %	900	900
Compression Set, %	12.0	9.0
Volume Shrinkage	12.5	12.5
Flex Resistance, 250,000 cycles @ 77°F. Permanent Set, %	3.0	2.0
Change in RMA compression after flexing, %	−19	−15
Aging, 22 hours @ 212°F. Change in RMA compression, %	+15	+11

TEST FORMULA FOR SHELL CL-104

	PARTS DRY
CL-104	100.0
Sulfur	2.5
Zinc diethyldithiocarbamate	1.5
Zinc salt of 2-mercaptobenzothiazole	1.5
Antioxidant	1.0
Potassium oleate soap	1.0
Trimene Base*	0.75
Zinc oxide	3.5
Sodium silicofluoride	3.0

*Naugatuck Chemical Co.

COMPRESSION SET COMPARISON



Graph compares the compression set of Shell's CL-104 and three other foams after aging 22 hours at 158°F. The RMA maximum specification for foam cushioning is 20 per cent. Notice how CL-104 exhibits good compression set while giving higher compression resistance at a lower density.

How to get samples and technical data on new Shell CL-104

Samples of new CL-104 latex are now available for your evaluation. To receive samples and data, call your Shell Chemical representative, or write one of the three Shell Synthetic Rubber sales offices listed to the right.

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Various Compounding Materials Consumed by the Rubber Industry

Material	1953	1954	1955	1956	1957	1958	1959
Antimony, Primary							
Short tons	20c	49c	78	156	284	265	217
% of total	0.1	0.4	0.5	1.0	2.3	2.2	1.6
Asphalt: [a]							
Short tons	.....	.....	....	.....	.....	.....	.....
% of total	.....	.....	.....	.....	.....	.....	.....
Barite (Barytes):							
Short tons	21,000	20,000	25,104	22,101	21,782	18,387	19,806
% of total	2.0	2.0	2.0	2.0	1.0	2.0	2.0
Carbon Black:							
Short ton	566,797	511,831	643,430	622,325	635,781	625,469	731,619
% of total	94.4	93.5	93.5	95.5	45.5	95.3	95.5
Clay, Kaolin:							
Short tons	241,052	247,431	257,223	268,157	301,185	282,493	322,875
% of total	12.8	13.2	11.9	12.0	14.0	12.7	12.7
Clay, Fire & Stoneware:							
Short tons	18,475	8,781	2,928	.....	.....	.....	.....
% of total	.2	.1	.2	.....	.....	.....	.....
Lime:							
Short tons	1,631	1,555	1,465	2,487	2,799	2,533	5,549
% of total	(d)	(d)	(d)	(d)	(d)	(d)	(d)
Litharge:							
Short tons	2,230	1,768	1,947	2,266	1,298	1,247	1,808
% of total	1.4	1.3	1.3	1.7	1.7	1.4	1.0
Lithopone:							
Short tons	1,723	1,701	2,163	2,000*	.....	.....	.....
% of total	3.3	3.9	5.0	5.0	.....	.....	.....
Mica, Ground:							
Short tons	5,668	5,021	7,339	7,021	8,579	9,622	12,101
% of total	7.8	6.3	6.9	8.0	9.0	9.9	11.5
Sulfur:							
Short tons	89,600	84,000	89,600	89,600	89,600*	.....	.....
% of total	1.4	1.3	1.2....	1.1	1.1	.....	.....
Talc: [b]							
Short tons	61,408	58,139	38,309	30,253	28,532	36,889	42,187
% of total	10.0	9.7	5.4	5.0	6.0	6.5	5.4
Zinc Oxide:							
Short tons	78,439	71,058	86,677	80,459	81,745	68,176	79,505
% of total	52.7	50.7	51.5	51.9	54.0	50.1	51.5

Source: U. S. Bureau of Mines.
Notes: (a) Solid and semi-solid products of less than 200 penetration. (b) Includes prophyllite and ground soapstone. (c) Does not include precipitated antimony sulfide as in previous years. (d) Negligible. (e) Estimated.

Reclaimed Rubber
(Including Natural and Synthetic)
(All Quantities in Long Tons)

Year	New Supply	Consumption: Tons	Consumption: % to Crude [a]	Exports	Stocks On Hand at End of Period
1946	**295,612**	**275,410**	**26.5**	**14,461**	**33,666**
1947	**291,395**	**288,395**	**24.8**	**14,556**	**35,943**
1948	**266,861**	**261,113**	**24.4**	**11,428**	**32,630**
1949	**224,029**	**226,679**	**22.5**	**10,637**	**28,263**
1950	**314,008**	**303,733**	**24.1**	**11,740**	**35,708**
1951	**366,700**	**346,121**	**25.6**	**14,722**	**45,082**
1952	**274,981**	**280,002**	**22.2**	**11,180**	**30,664**
1953	**298,336**	**285,050**	**21.3**	**11,597**	**32,319**
1954	**258,101**	**249,049**	**20.2**	**10,232**	**30,746**
1955	**326,649**	**312,781**	**20.4**	**13,988**	**31,498**
1956	**287,220**	**270,547**	**18.8**	**13,832**	**34,969**
1957	**271,647**	**267,352**	**18.2**	**13,021**	**29,323**
1958	**259,809**	**248,156**	**18.2**	**11,362**	**29,063**
1959	**303,479**	**286,410**	**20.0**	**11,757**	**27,738**
1960	**293,106**	**278,763**	**17.9**	**13,678**	**33,048**
1960:					
Apr.	**26,221**	**24,210**	**18.2**	**1,248**	**30,916**
May	**25,676**	**23,763**	**17.8**	**1,167**	**32,611**
June	**25,516**	**24,677**	**17.8**	**1,164**	**31,699**
July	**21,512**	**19,249**	**16.8**	**1,384**	**33,624**
Aug.	**23,540**	**21,452**	**16.3**	**951**	**33,979**
Sept.	**22,306**	**22,101**	**17.8**	**1,028**	**33,949**
Oct.	**23,546**	**23,269**	**18.5**	**804**	**33,519**
Nov.	**22,023**	**21,014**	**17.2**	**1,167**	**33,783**
Dec.	**20,010**	**19,921**	**17.8**	**859**	**33,048**
1961:					
Jan.	**22,528**	**22,052**	**18.2**	**1,084**	**33,101**
Feb.	**19,724**	**18,550**	**17.0**	**1,208**	**33,493**
Mar.	**21,824**	**20,558**	**17.0**	**1,073**	**32,695**
Apr.	**21,406**	**20,736**	**17.9**	**1,349**	**31,593**
May	**23,317**	**21,989**	**19.5**	**1,396**	**31,663**
June	**25,115**	**21,983**	**17.0**	**1,600**	**32,598**
July	**19,109**	**17,299**	**15.9**	**1,369**	**33,271**
Aug.	**22,505**	**20,588**	**15.2**	**...**	**33,037**

Source: U. S. Department of Commerce.
Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. (*) Includes natural and synthetic rubber.

Cotton, Rayon and Nylon Tire Fabrics
(In Thousands of Pounds)

	Production: Rayon Tire Cord Not Woven	Production: Rayon Tire Cord Woven	Production: Cotton and Nylon Cord & Fabric [a]	Production: Chafer Fabrics (all fibers)	Production: Total Tire Cord and Fabric	Stocks [b]: Cotton and Nylon Cord & Fabric	Stocks [b]: Rayon Cord and Fabric
1960:							
Jan.-Mar.	68,699	68,699	45,461	11,389	116,816	15,676	36,841
Apr.-June	64,692	64,692	49,841	10,527	117,299	15,337	33,905
July-Sept.	51,830	51,833	39,299	7,728	93,101	18,347	31,191
Oct.-Dec.	54,388	54,388	34,438	7,217	91,223	16,532	25,143
Total	239,609	239,609	169,039	36,856	418,439	65,892	127,080
1961:							
Jan.-Mar.	56,287	56,287	37,459	8,378	95,934	14,580	25,574
Apr.-June	45,303	45,303	49,212	8,020	97,262	19,021	22,546
July-Sept.	.....	.....	.....	.....	.....	.....	.....
Oct.-Dec.	.....	.....	.....	.....	.....	.....	.....
Total	.....	.....	.....	.....	.....	.....	.....

Source: Bureau of the Census, U. S. Department of Commerce.
Notes: (a) Combined to avoid disclosing figures for individual companies. (b) At end of period.

Gasoline Consumption
(In Thousands of Barrels of 42 Gallons)

	1955	1956	1957	1958	1959	1960	1961
Jan.	96,397	100,642	109,295	107,281	114,720	111,311	114,455
Feb.	88,464	98,088	96,694	95,516	99,759	108,871	105,589
Mar.	105,684	112,412	113,166	108,914	118,995	120,497	126,592
Apr.	111,116	113,034	115,820	118,477	124,917	129,094	119,188
May	115,707	123,560	124,325	125,137	127,049	129,952	137,153
June	120,710	126,833	121,598	125,444	133,695	138,909	138,500
July	115,653	120,708	130,251	130,903	137,141	135,838	137,400
Aug.	121,816	125,847	128,808	129,925	132,875	138,371	.....
Sept.	113,379	111,574	113,567	120,389	130,264	128,530	.....
Oct.	112,558	119,204	119,334	125,097	120,858	126,242	.....
Nov.	109,212	112,113	107,705	110,587	116,056	124,855	.....
Dec.	111,034	108,096	112,691	120,305	123,587	124,937	.....
Total	1,321,730	1,372,116	1,393,254	1,417,975	1,479,907	1,517,407	.....

Source: U. S. Bureau of Mines.

U. S. Gross Imports of Balata, Jelutong, Gutta-Percha, etc.
(All Quantities in Long Tons)

Year	Balata: Tons	Balata: Value	Jelutong: Tons	Jelutong: Value	Gutta-Percha & Other Guttas: Tons	Gutta-Percha & Other Guttas: Value
1956	1,396	1,111,165	1,851	1,909,447	290	309,615
1957	1,037	670,821	1,680	1,942,067	230	270,487
1958	745	536,820	1,501	1,698,840	157	224,499
1959	1,512	1,350,843	1,296	1,608,986	268	311,178
1960	2,531	2,632,102	941	1,026,244	320	528,916
1960:						
June	75	59,506	128	142,962	35	45,136
July	108	144,740	68	76,761	24	56,317
Aug.	207	213,484	88	99,726	35	55,090
Sept.	960	540,589	26	27,889	28	38,363
Oct.	420	659,078	39	41,574	11	13,230
Nov.	365	534,852	51	58,977	29	74,331
Dec.	26	64,983	82	97,396	13	37,166
1961:						
Jan.	117	221,468	31	35,439	39	91,191
Feb.	54	94,584	31	106,564	19	45,083
Mar.	45	74,157	42	57,455	1	9,081
Apr.	101	57,779	96	130,173	18	44,094
May	35	23,584	95	130,135	8	9,100
June	64	43,990	47	60,079	16	28,927
July	117	118,369	80	105,443	87	102,031

Source: U. S. Department of Commerce.

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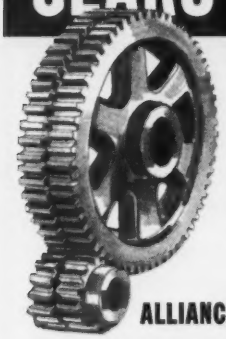

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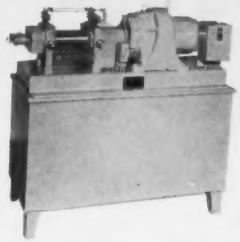

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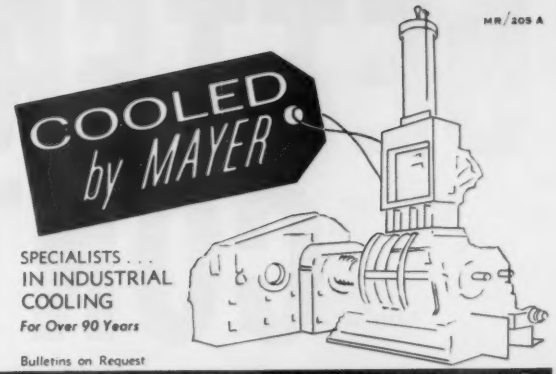

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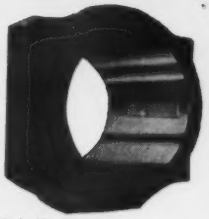

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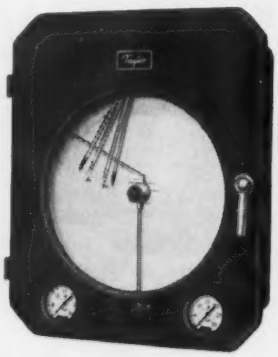

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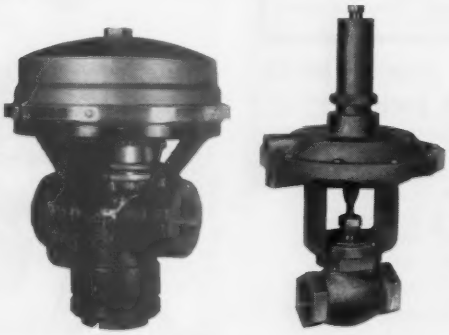

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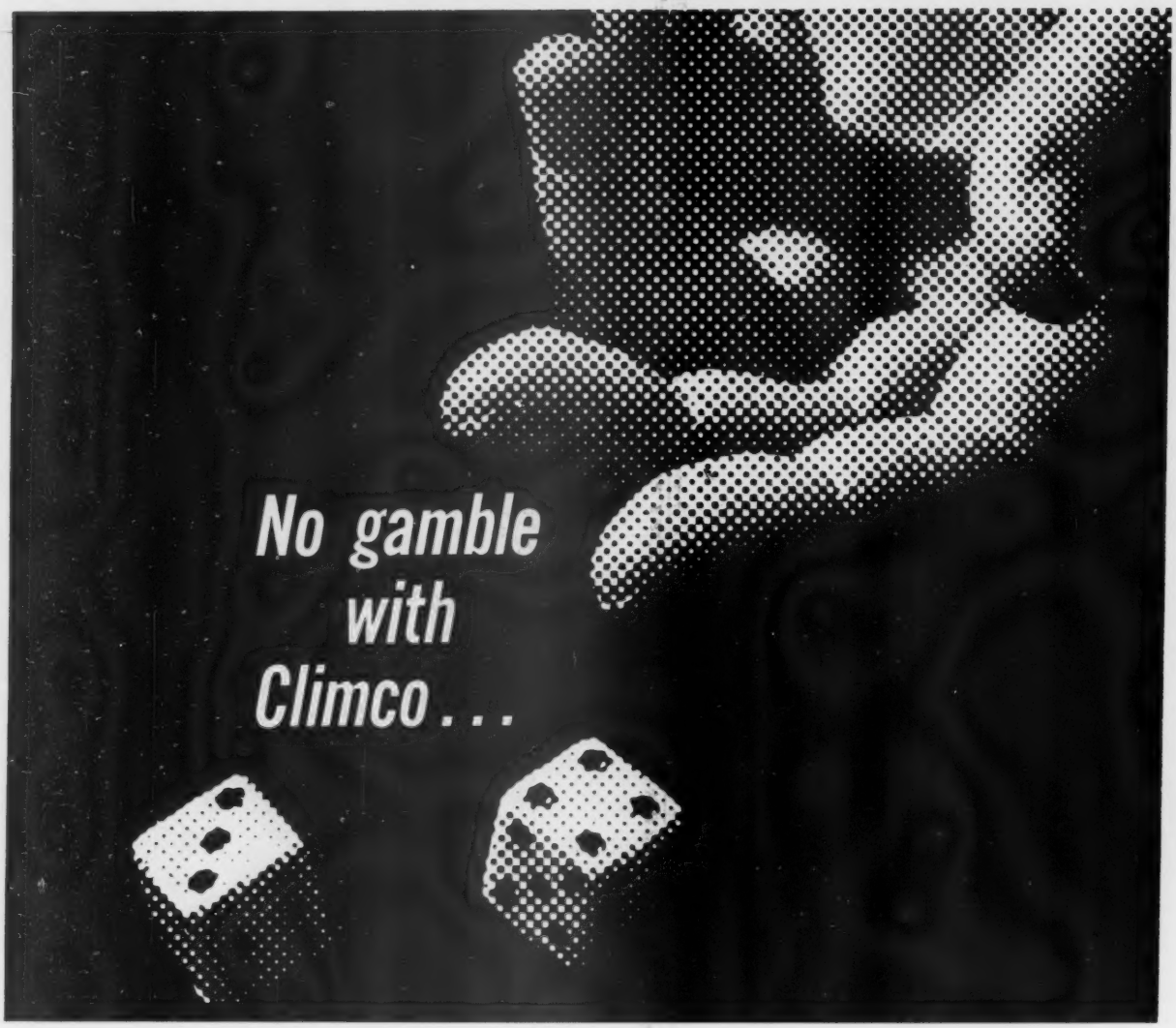

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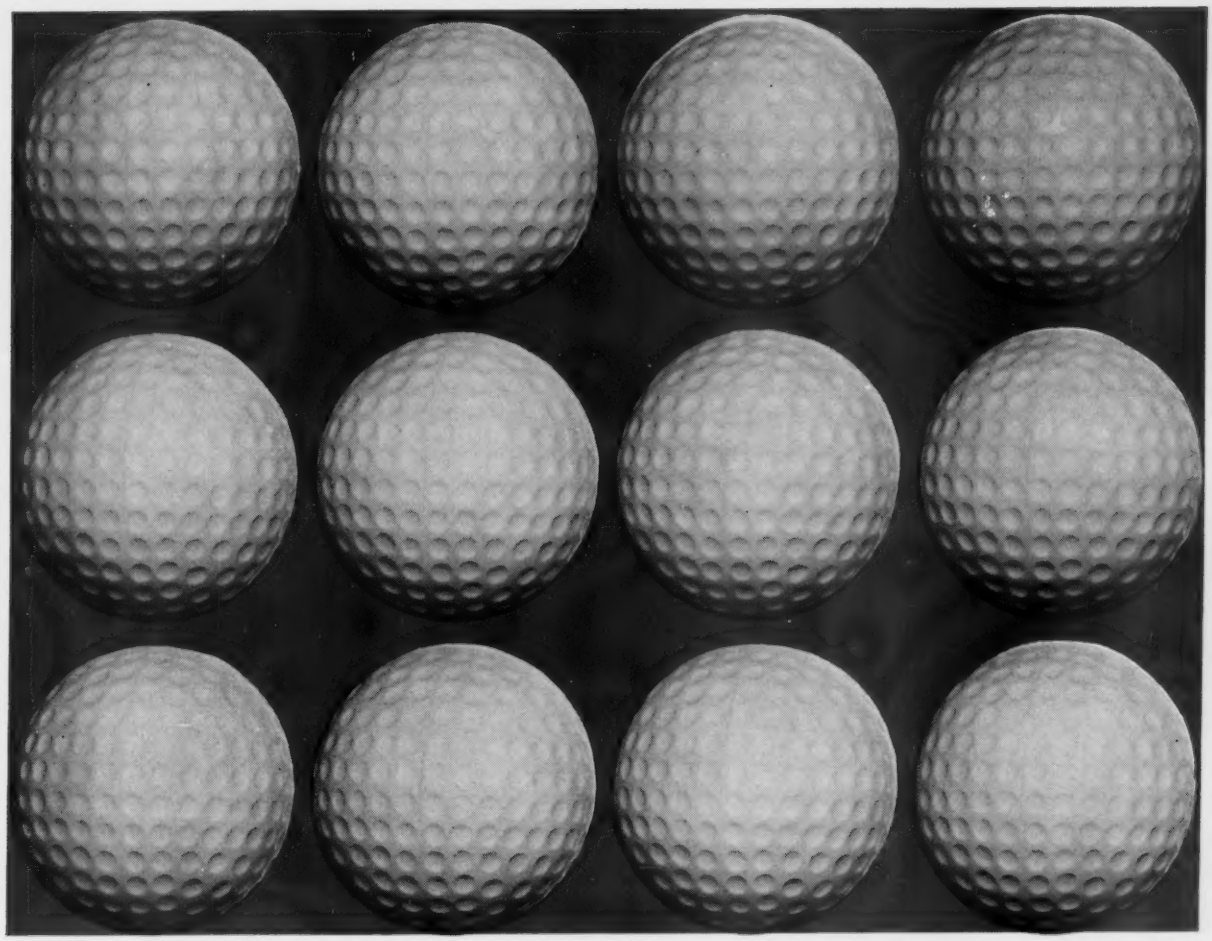

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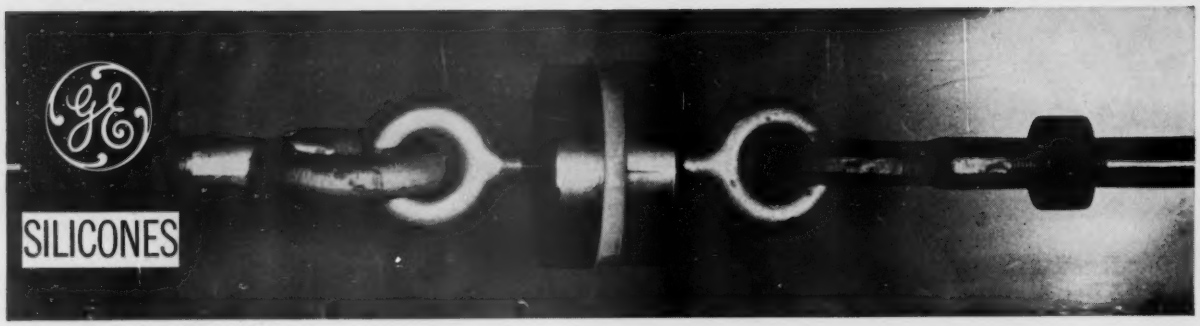
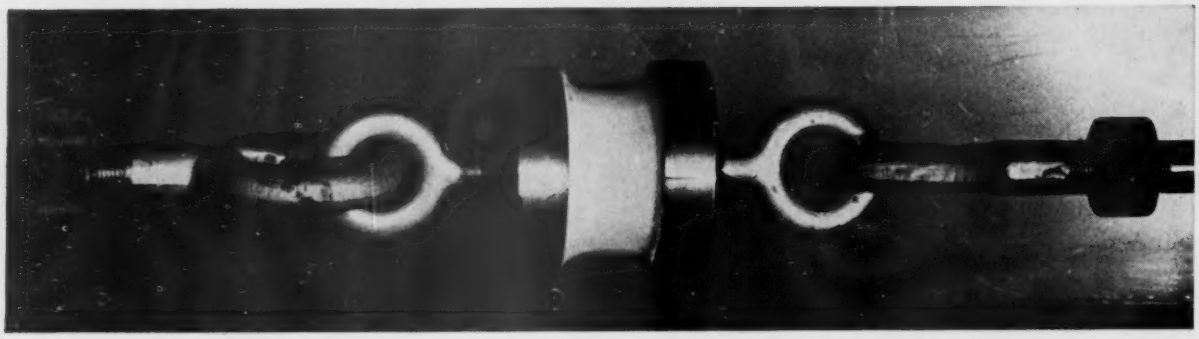


New General Electric silicone rubber bonds



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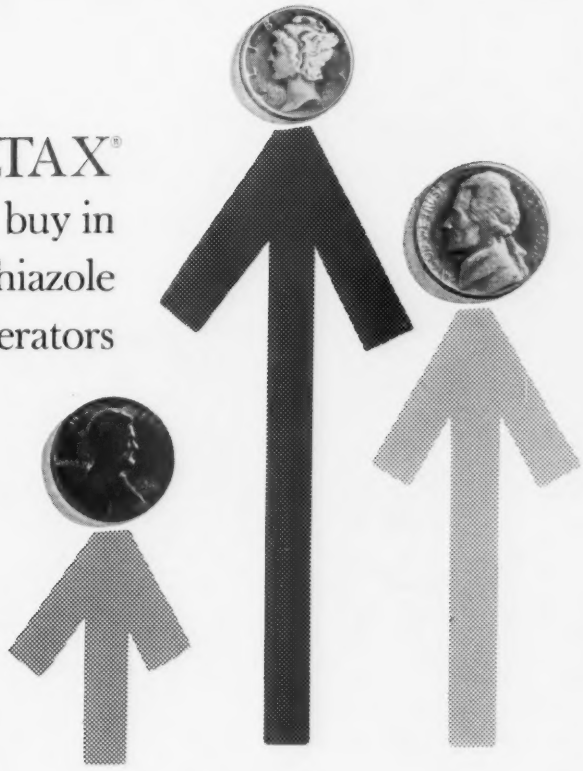

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